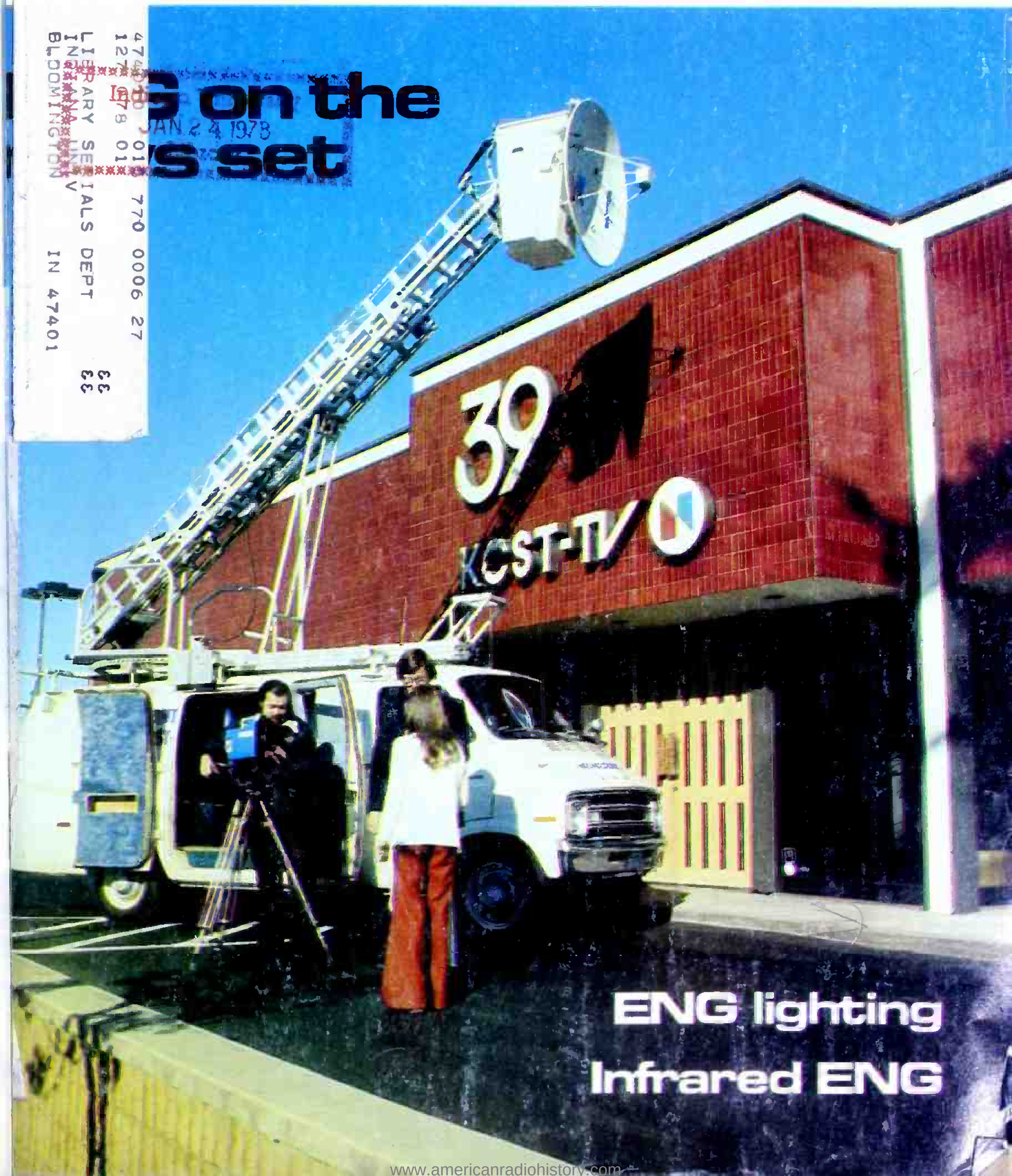
BROADCAST ENGINEERING®

January, 1978/$2.00

cPR



ENG lighting
Infrared ENG

At Home. Or Away.

At home in the studio, or away on location, Ward-Beck's flawless performance comes through for you.

The same engineering expertise, imaginative design concepts, and unparalleled craftsmanship, provide a depth of quality that is inherent in every Ward-Beck console, whatever its application.

For those who want a consistent winner, there is really only one choice.

Mobile multi-track recording console WBS Model 76042

WBS

Tomorrow's Technology Today.

Ward-Beck Systems Ltd., 841 Progress Avenue, Scarborough, Ontario, Canada M1H 2X4
Telephone (416) 438-6550. Telex 065-25399

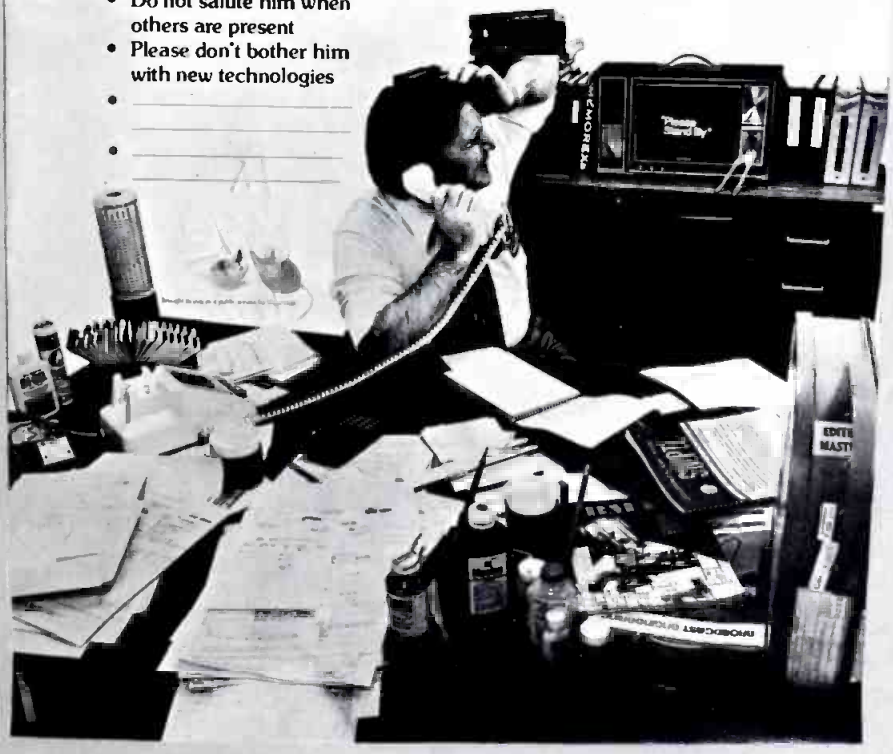
Ward-Beck Systems Inc., 290 Larkin Street, Buffalo, N.Y. 14210

YOU ASKED FOR IT!

Fourth in a series of posters roasting everybody from Tape Technicians to Chief Engineers.

This is National Be Kind to Chief Engineers Week

- Please don't call him chief
- Remind him that Ohm's Law is not a recent Supreme Court decision
- Don't make him late for his group therapy session
- Do not hide his NAB handbook
- Do not salute him when others are present
- Please don't bother him with new technologies
- _____
- _____

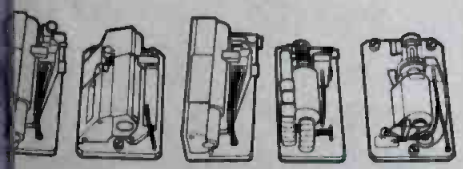


e, do Chief
ers have a
of humor?"

"Sure, Max. And they can read, too."

When you do only one thing - you better do it well. Since 1970, Videomax has satisfied more client requirements for quad head refurbishment than any other firm in the field.

Call or write for your free poster.



VMX® videomax®

Videomax Corporation, An Orrox Company
3303 Scott Boulevard, Santa Clara, CA 95050
Phone: (408) 988-2000 Telex: 910-338-0554

ES & SERVICE—New York: (212) 947-8031, Los Angeles: (213) 980-7927, Atlanta: (404) 992-4490, Munich: (089) 96-76-22

For More Details Circle (3) on Reply Card

January, 1978 ☐ Volume 20 ☐ No. 1

BROADCAST engineering

The journal of the broadcast-communications industry

Page 48

Contents

About the Cover

One of the ENG vans operated by KCST, San Diego, is equipped with a ladder which extends the microwave dish 30 feet above ground. Coverage of KCST's ENG capabilities begins on page 40. (*Photo by Danny Mendez.*)

Departments

Editorial, advertising and circulation correspondence should be addressed to: 9221 Quivira Road, P.O. Box 12901, Overland Park, KS 66212 (a suburb of Kansas City, Missouri); (913) 888-4664.

EDITORIAL
Ronald N. Merrell, *Editorial Director*
Michael Scheibach, *Managing Editor*
Ron Whittaker, *Production Spotlight*
Howard T. Head, *FCC Rules*
Joe Roizen, *Video*
Peter Burk, *Radio Workshop*
Dennis Ciapura, *Audio*
Robert A. Jones, *Facilities*
Carl Babcoke, *Technical*
Cindy Nelson, *Editorial Assistant*
Dudley Rose, *Graphic Designer*

CIRCULATION
Greg Garrison, *Director*
Evelyn Rogers, *Manager*

ABP
Member American Business Press

BPA
Member Business Publications Audit of Circulation

ADMINISTRATION
George H. Seferovich, *President*
Mike Kreiter, *Publisher*

ADVERTISING SALES
Jan Winters, *Production*
P.O. Box 12901
Overland Park, KS 66212
(913) 888-4664
Regional advertising sales offices listed on ad index page.

BROADCAST ENGINEERING is published monthly by Intertec Publishing Corp., 9221 Quivira Road, Overland Park, KS 66212.

BROADCAST ENGINEERING is edited for corporate management, technicians/engineers, and other station management personnel at Commercial and Educational radio and TV stations. Teleproduction studios, recording studios, CATV and CCTV facilities, and government agencies. Qualified persons also include consulting engineers, dealer/distributors of broadcast equipment.

SUBSCRIPTIONS: BROADCAST ENGINEERING is mailed free to qualified persons in occupations described above.

Non-qualified subscriptions in the U.S. are $20.00 one year. Outside the USA $26.00 one year. Back issues rate $3.00. Adjustments necessitated by subscription termination at single copy rate.

Allow 6-8 weeks for new subscriptions.

Allow 6-8 weeks delivery for change of address.

Controlled circulation postage paid at Kansas City, Missouri.

INTERTEC PUBLISHING CO.

GRASS VALLEY GROUP

PRODUCTION SWITCHING SYSTEMS

NOW AVAILABLE WITH **DVE**

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) 321-4318

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

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

DIRECT CURRENT FROM D.C.

January, 1978/By Howard T. Head and Harold L. Kassen

Commission Investigating Putting AM Directional Antenna Patterns on Computer

The FCC has instituted an inquiry to study the conversion of all existing standard broadcast directional antenna patterns to models which would permit greatly increased use of computers in making allocation studies. Over 2000 existing AM DAs are involved.

Although virtually all AM DAs can be represented and calculated by their electrical parameters, present procedures require that allocation studies be based on the latest version of the "measured" pattern rather than the computed pattern. Not only is the process time-consuming, it has led to numerous errors in the past as new and revised "measured" patterns are filed with the commission.

Numerous problems are involved, both technical and legal, involving definitions of service, interference, and protection. In addition, our treaties with other North American countries must be taken into account. However, the commission feels it *must* take some affirmative action to relieve the burden in processing applications. The best bet is that all AM stations employing DAs will eventually be required to file new patterns capable of machine manipulation.

Filings Heavy In VHF TV Drop-in Proposal

The commission has been deluged with filings in connection with its proposals to assign VHF television channels at short spacings to four markets. The markets involved are Knoxville, Tennessee; Charleston-Huntington, West Virginia; Johnstown-Altoona, Pennsylvania; and Salt Lake City, Utah.

Most parties commenting have opposed the commission's proposals on the grounds that massive interference losses would occur to existing broadcast reception and the desirability of exploiting the UHF TV band for future TV growth. Opposition came from trade associations and from both VHF and UHF licensees.

continued on pag

INSTANTANEOUS Digital Command

30 Functions for only $1995

FT Model 7601 represents a major break-rough in remote control systems. Now, you an get 20 channels of digital command func-ons plus 10 channels of digital telemetry func-ons for less than $2000! And it's the same high uality, reliable design that has made TFT quipment a standard in the broadcast industry. ust check this line-up of features:

ATA SECURITY ASSURED
ull command-code redundancy, *plus* odd/ ven parity check, makes digital data errors rtually impossible. A TFT proprietary feature. ven lightning induced noise has no effect on tegrity of command functions.

NSTANTANEOUS COMMAND
ess than 0.2 second marks the time for a com-lete command/execute function with the new FT high speed data modem.

NE MAN CALIBRATION
he front panel of the Model 7601R (Remote erminal) has a DVM and scaling potentiome-rs so that just one man, on-site, can perform e FCC required weekly calibration. A studio ck-out switch provides complete operator afety for on-site work.

CHOICE OF TRANSMISSION METHODS
Model 7601 interconnection can be either tele-phone lines or radio links which include STL, TLS or SCA.

MINIMAL SERVICE DOWNTIME
Quick-disconnect rear barrier strips allow fast removal of the 7601 from the rack without dis-connecting any of the interface wiring between the remote terminal and the transmitter or alarm sampling points.

TEN OPTIONAL STATUS CHANNELS
In addition, 10 status indicator functions may be factory or field installed to provide instant status display and alarm.

The Model 7601 is just one of a full line of field-proven, reliable, fail-safe remote control sys-tems offered by TFT. Other remote control systems designed for AM, FM and TV include the Model 7610, 120-channel digital telemetry/ status/control system, the TELESCAN* auto-logging multi-channel CRT display and toler-ance alarm system, and a complete line of remote control accessories. They're all avail-able now from TFT. Call or write:

*Trademark pending

TFT *TIME & FREQUENCY TECHNOLOGY INC.*
3000 OLCOTT STREET, SANTA CLARA, CA 95051 (408) 246-6365 TWX No. 910-338-0584

For More Details Circle (4) on Reply Card

DIRECT CURRENT FROM D. C.

continued from page 4

The next procedural step is the filing of replies to the initial comments, and these replies will be due early in 1978. The FCC may reach a decision during the year, although the complexity of the issues involved may delay final commission action.

Commission Institutes Inquiry On "Saturated" CATV Systems

The commission has invited comments on the problems created by its carriage and non-duplication CATV rules for cable systems having limited channel capacity. The inquiry stems from a growing number of instances where cable systems having only a 12-channel capacity find themselves required by the FCC's Rules to carry more than 12 channels of programming.

In adopting the present CATV rules in 1972, the commission originally provided a 5-year interval during which all cable systems would be required to expand to a minimum capacity of 20 channels. However, this requirement was abandoned last year and many systems fi themselves with a practical capacity of 12 channels or often less.

A wide variety of options are available, including setting some system of carriage priorities, permitting carriage of some signals on mid-band frequencies at the request of subscribers, or other approaches.

Short Circuits

The NAB has objected to a proposal by a manufacturer of FM directional antennas which would classify as directional all FM antennas having a radiation pattern with circularity worse than +4 dB ...The report of the tests on AM Stereo Systems has been filed with the FCC...The commission has tightened its rules governing the determination and maintenance of output power...The commission now permits the unattended operation of FM translator stations...The commission has instituted an inquiry into the adoption of rules to provide for quadraphonic FM sound, asking "Does anybody want it?" ...It's-About-Time Department: General Motors has received an experimental license for transmissions in the FM broadcast band in an attempt to invent an automobile FM antenna that works.

We Are

American Data Corporation

American Data joins the growing electronics family of *North American Philips Corporation* as a company dedicated to the principles of good products at competitive prices and backed by the kind of after-sales service that the Broadcast Industry demands.

From a single distribution amplifier or a simple input switcher to our most advanced computer-controlled distribution switcher or our sophisticated fourth-generation 558-3 Production Switcher, shown here, *American Data* is dedicated to quality and service. We can fill all your equipment requirements.

If you haven't considered *American Data* before, or don't know about the new *American Data*, why not find out now? Write us for more information or contact your nearest *American Data* representative.

American Data Corporation
A North American Philips Company
Research Park • P.O. Box 5228
Huntsville, Alabama 35805

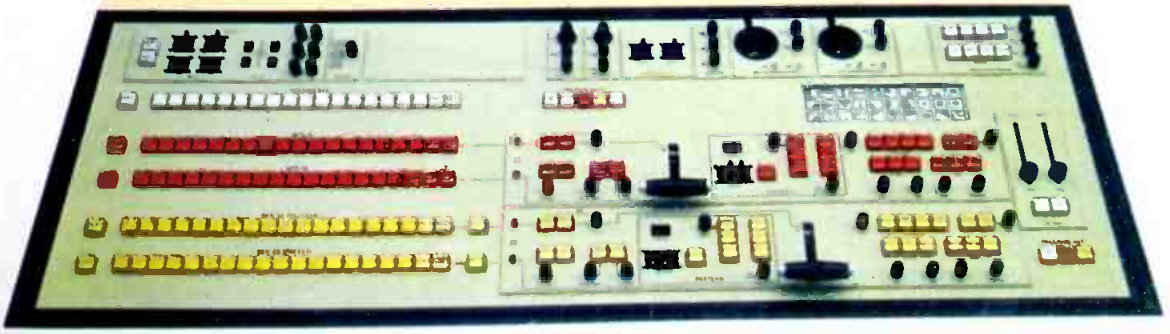
ADC NORTHEAST
Bob Munzer, Regional Mgr.
P.O. Box 452
New Hartford, CT 06057

ADC MID-ATLANTIC
Dwight Wilcox
5504 Waterway
Rockville, MD 20853

ADC SOUTHEAST
Joe Ryan, Regional Mgr.
2219 Oakawana Rd., N.E.
Atlanta, GA 30345

ADC MIDWEST
Jim Gardner, Regional Mgr.
P.O. Box 27324
Indianapolis, IN 46227

ADC WEST
3760 Cahuenga Blvd.
North Hollywood, CA 91604



For More Details Circle (5) on Reply Card

The Sony BVE-500A. It's the best editing decision you'll ever make.

Announcing the professional automatic editing control unit professional editors have been waiting for. The Sony Broadcast BVE-500A.

Already, the earlier BVE-500 has been accepted as the state of the art in control track editing by broadcasters around the world. In the new BVE-500A, we've made substantial improvements that increase the speed, versatility, and convenience of the editing process.

Compare these editing advantages with existing equipment, and consider the added creative capabilities you get with the Sony Broadcast BVE-500A.

1. BIDIREX control. The big news in the BVE-500A is BIDIREX: two self-return search dials that take the place of ordinary pushbutton search controls. Many control instructions have been built into these BIDIREX dials to allow an operator to shuttle tape in forward and reverse direction at various speeds.

BIDIREX eliminates mode selection error. And it gives Sony U-matic editing a true "film" feeling ordinary editing systems can't match.

2. Decision Prompter. The new BVE-500A uses lamps to prompt the operator to the mode and progress of all editing decisions.

Function lamps blink until the edit commands are made, then go automatically to "steady on." Even in a busy newsroom, with many interruptions, an operator can tell at a glance the status of his last instruction as the BVE-500A prompts him for the next command.

3. Automatic Entry. The BVE-500A saves valuable time with a feature that automatically enters the "IN" point when the preview button is engaged.

If the operator has already selected an "IN" point, this auto mode has no effect; the editor may preview without disturbing his pre-selected "IN" point.

4. New Full Time Counter. The BVE-500A counts control track pulses from −79 minutes through 0 to +79 minutes. An operator need not concern himself with the count when he initiates an editing sequence.

5. Short Pre-Roll. When used with external sync, pre-roll is reduced from five seconds to three seconds, a further time-saving advantage.

6. Cue Control. The BVE-500A features built-in cue record and erase. This 1kHz tone is recorded on Audio 1, and is useful for both auto control systems and pre-cueing the tape to air.

These are just a few of the new BVE-500A features.

Others include auto shut-off, external interface of control logic, manual edit capability, and more. You can see them all in action when you ask for a demonstration of this versatile new editing control unit. To do that, just contact your nearest Sony Broadcast office.

Sony Broadcast

Sony Corporation of America, 9 West 57 Street, New York, New York 10019
New York: (212) 371-5800 Chicago: (312) 792-3600 Los Angeles: (213) 537-4300 Canada: (416) 252-3581

Sony® is a registered trademark of Sony Corporation of America

For Literature Only Circle (6) On Reader Service Card
For Demonstration Only Circle (7) On Reader Service Card

industry news

Mutual and Western Union sign satellite pact

The Mutual Broadcasting System, the world's largest radio network, has signed a seven-year contract with Western Union for the use of their Westar I satellite to bring direct programming to Mutual's affiliate stations.

Pending approval from the FCC, the contract will provide a carrier enabling Mutual programs to be delivered via satellite to more than 500 10-foot diameter receiving terminals at Mutual radio affiliate stations across the nation, as well as Alaska, Hawaii, Puerto Rico, and the Virgin Islands.

Mutual and Western Union will ask the FCC to permit Mutual's programs to be transmitted from Mutual's world headquarters in the nation's capital to Westar I, then directly to each of the receiving terminals, and finally, to Mutual's more than 780 affiliate radio stations, in addition to the 90 affiliates of the Mutual Black Network, the first black network.

C. Edward Little, Mutual president, called the agreement a "momentous step" in radio history.

"This contract means that no longer will network radio broadcasts be fed exclusively through land lines provided by the telephone companies," the network president said. "Commercial radio network broadcasting will now move into the computerized space age for the first time in the history of the industry."

He added: "Within 18 months, following FCC approval, Mutual will be able to feed as many as three simultaneous programs nationwid on three separate channels, or will have the capability to transm in stereo. And in the future, Mutue will be able to feed as many as si programs at the same time," Littl said.

"It means that in addition to th newscasts, sportscast, sportin events, and other programs we no feed to our affiliates on a 'round th clock, seven-day-a-week basis w will be able to feed them othe programs at the same time—footba games, say, or continuous musi programming, a congressional de bate, a talk program, a rock concer or whatever."

"For radio stations and for radi listeners, there is a bright da coming—a day with incredibly wid latitude of program selection an network professionalism," the Mu tual president said.

Gary Worth, executive vice pres ident responsible for Mutual's affil iate relations and the satellite pro ject, pointed out the unusual qualit of Mutual's satellite signals to net work affiliates. Because of bein transmitted from space, he said, th signals will have "15 kHz quality."

"Never before in the history o the medium, have networks bee able to feed their programs to loca stations in the super high fidelit the Mutual satellite transmission will have," Worth said.

Looking back, the Mutual execu tive said, "If this quality had bee available to radio networks in th past, particularly when televisio had its impact in the 1950s, perhap the evolution of network radio t what it is now would not hav happened, would have been entirel different."

Mutual provides hourly and hall hourly newscasts around the cloc 365 days a year, along with dail sportscasts and live coverage of th nation's major sporting events— weekly Notre Dame football games twice-weekly NFL football games NCAA basketball, NBA playoffs leading golf tournaments, and majo tennis matches.

continued on page 1

Left to right: F. L. Pendleton, manager of applications engineering, California Microwave Inc., manufacturer of the satellite terminals; James T. Ragan, vice president for broadcast services, Western Union, whose Westar I satellite transmits to the antenna; Dr. David B. Leeson, president, California Microwave; E. Edward Little, president Mutual Broadcasting System; Jay Van Andel, chairman of the board, Amway Corporation; and, Gary J. Worth, executive vice president, Mutual Broadcasting System.

Neve

The world's foremost name in professional mixing consoles

The NEW AM/FM Radio Console

After nearly two years in the making, Neve is introducing model 5402 (CRC), a low profile console primarily designed for radio station applications, on-air and production. Configured with mono and/or stereo channels, mic and/or line inputs, simple plug-in circuit cards also offer facilities for voice-over, echo, foldback and DA outputs. And the price is very attractive starting around $7,500* for a 10 input stereo configured console.

Model 5402

Model 5305

Model 5305 TV Production Console

Designed as a 4 bus 2 main output console, this model is ideal for the small to medium sized TV station for production as well as on-air use. Many optional facilities are available, enabling us to customize a console for your particular application and keep delivery lead times to a minimum. A fully fitted 12 input console with good equalization is priced at $17,950*. This is exceptionally good value in the marketplace.

Custom Designed Consoles

Neve is believed to be the largest producer of sound mixing consoles in the world, employing around 400 dedicated people in two manufacturing plants and four subsidiary sales and service companies. Our consoles are in use in over 50 countries, many in network and station broadcast facilities in Canada and the U.S. We have the capability to design and build any type and size of console to the state of the art, and pride ourselves in keeping delivery promises. Please accept our invitation to discuss your custom console requirement with us.

Multitrack Production Consoles

Through our leading position in the field of music recording, we are able to deliver Broadcast Multitrack Production Consoles with optimum multitrack as well as broadcast facilities. 8, 16 and 24 track consoles are often in stock, and we are eager to please customers by incorporating special facilities on short lead time. 8 track consoles start around $29,000*, 16 track around $38,000*, and 24 track around $66,000*. Check our competition, and you'll be surprised to realize our price competitive position!

***FOB Bethel, Conn.**
Subject to change.

Call Tony Langley (203) 744-6230

Rupert Neve Incorporated, Berkshire Industrial Park, Bethel, Connecticut 06801 Tel: (203) 744-6230 Telex: 969638
Rupert Neve Incorporated, Suite 609, 6255 Sunset Blvd., Hollywood, California, 90028 Tel: (213) 465-4822
Rupert Neve of Canada, Ltd., 2717 Rena Road, Malton, Ontario L4T 3K1 Canada Tel: (416) 677-6611 Telex: 983502

Neve

For More Details Circle (8) on Reply Card

news

continued from page 10

St. Louis station fined by FCC

The FCC has fined a St. Louis radio station $5,000 for failure to log the actual duration of commercial announcements.

It also admonished the station for exceeding the amount of commercial time which it had stated would be broadcast each hour. The violations occurred on seven days in November 1976, and January and February 1977.

The commission said a comparison of the station's program logs with recordings made when the FCC was monitoring the station indicated that the time logged for various commercial announcements deviated substantially from the actual broadcast time. It said many announcements were logged as 30-second spots o 60-second spots when they range from 42 seconds to two minutes fo the 30-second, and 12 seconds t four mintues and five seconds fo the 60-second spots.

Therefore, the commission sai the station had violated Sectio 73.112 of the rules which provide that the duration of each commer cial or the amount of commercia time in each hour be logged.

In addition to fining the statio $5,000 for the logging violations, th FCC admonished the station fo broadcasting up to 26 minutes o commercial programming in on hour when the station's 1973 an 1976 renewal applications state that it ordinarily limited commercia programming to 18 minutes each hour.

It added that the station wa expected to adopt procedures t prevent such violations in the future and the matter was being made par of the station records.

Log Entries

January

18—New Jersey Broadcasters Association, annual Midwinter managers meeting. American Hotel and the National Broadcasters Hall of Fame, Freehold, New Jersey.

19-20—First US/Southeast Asia Telecommunications Seminars Program and Exhibit. Hyatt Singapore Hotel, Singapore.

21—Florida Association of Broadcasters, Midwinter conference. Errol Estate Inn, Orlando.

22-25—National Religious Broadcasters, 35th annual convention. Washington Hilton Hotel, Washington, D.C.

February

14-16—All Electronic Show. Grosvenor House Hotel, London.

14-16—Synergetic Audio Concepts, Seattle area sound engineering seminar. Sea Tac Red Lion, Seattle.

22-24—Synergetic Audio Concepts, San Francisco area sound engineering seminar. Holiday Inn, Belmont, California.

27-28—Worcester Polytechnic Institute, Project Management seminar. WPI campus, Worcester, Massachusetts.

March

13-16—Electronics Industries Association, annual spring conference. Washington, D.C.

13-17—IEA/Electrex; International Electrical, Electronic and Instrument Exhibition. National Exhibition Centre, Birmingham, England.

27-28—Worcester Polytechnic Institute, Project Management seminar, Hotel Sonesta, Cambridge, Massachusetts.

April

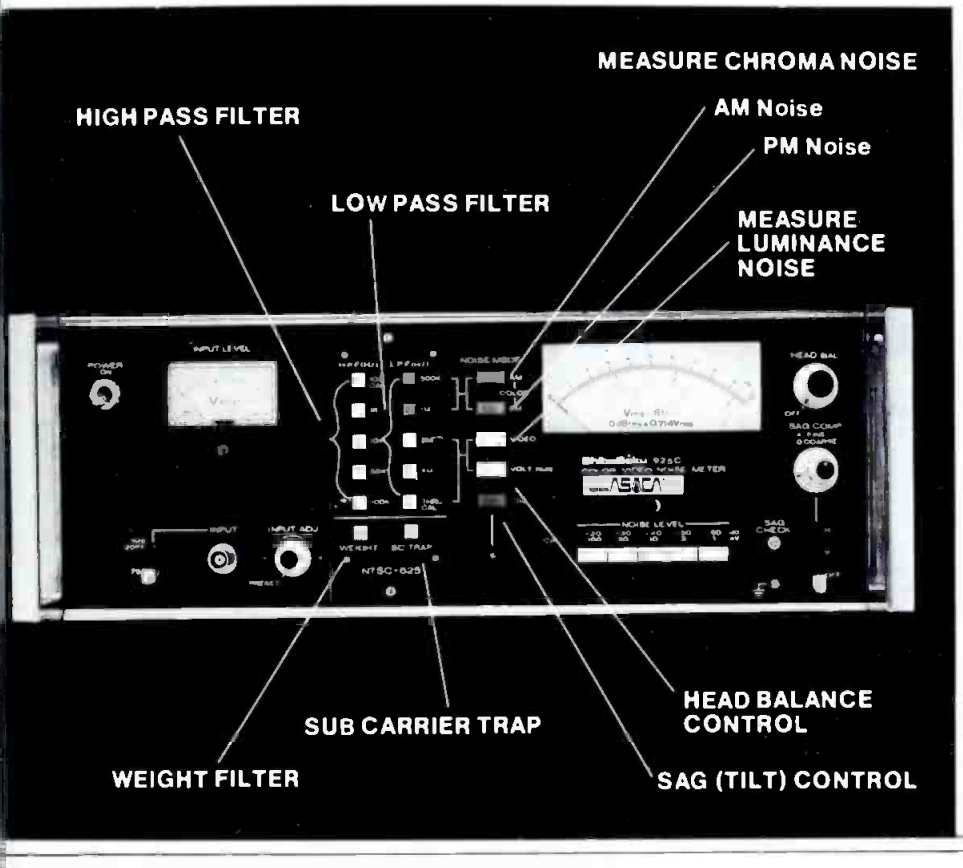
4-7—Communication Equipment and Systems Exhibition. National Exhibition Centre, Birmingham, England.

9-12—National Association of Broadcasters, annual convention. Las Vegas.

12-26—MIP-TV, 14th annual international marketplace for producers and distributors of TV programming. Palais des Festivals, Cannes, France.

continued on page 1

MEASURES CHROMA NOISE AND LUMINANCE NOISE



World's first Instrument to Measure Chroma Noise Generated In Color and Black and White Television Transmission Equipment, TV Cameras, VTRs, Video Disc Units, Digital Image Processors.

Measure the value of this unique instrument*, Model 925C Video Noise Meter, and you'll see why it has been purchased by a major USA network. It measures chrome band noise with a single color signal of desired level that contains both a sync signal and a color burst signal. Chroma noise can even be split into AM and PM components which can be measured separately. Unbalanced 2 head of VTR can be corrected for proper measurement.

A must for every station and production house in TV. Write for information.

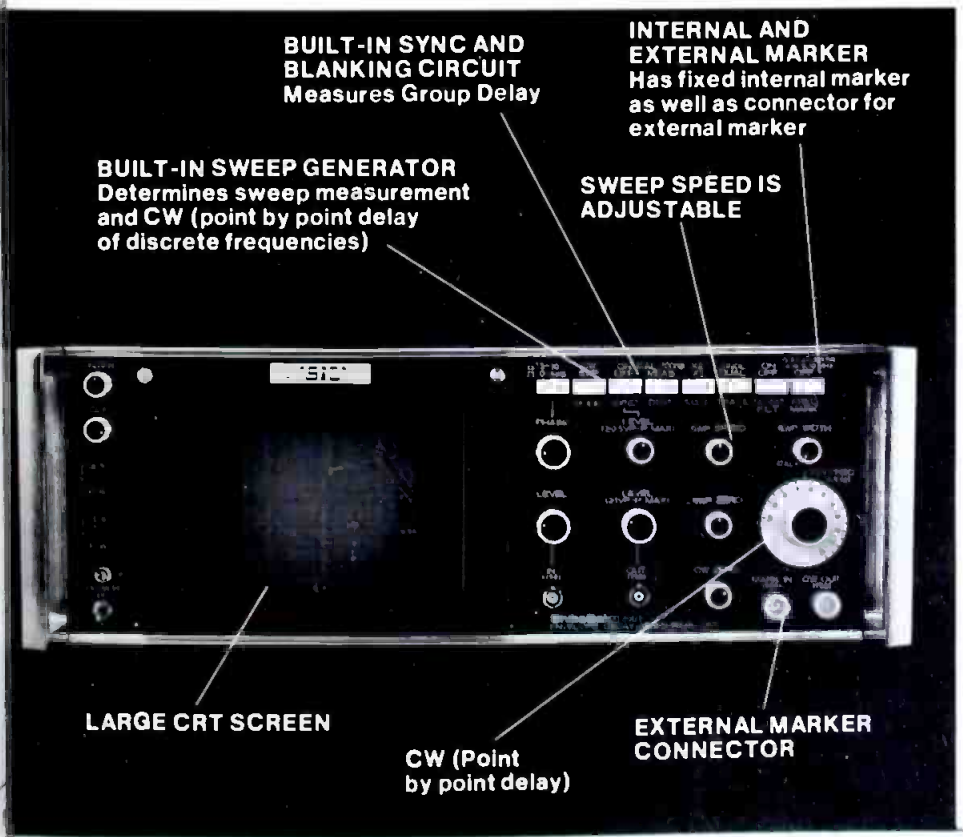
We create change

ASACA

ASACA CORPORATION OF AMERICA
1289 Rand Road, Des Plaines, Ill. 60016
Phone (312) 298-4380

*Product of SHIBASOKU—sister company of ASACA

MEASURES GROUP DELAY IN TRANSMISSION SYSTEMS & LINES



At last! The Envelope Delay Measuring Set You've Always Wanted—But Which Technology Couldn't Develop Until now! Compare Performance With Equipment Selling For $14,000.00. Our Price—Only $5,900.00!

Our envelope Delay Measuring Instruments* feature large CRT screens, built-in sweep generators and allow spot frequency delay measurements from 50 KHz to 5MHz. Check out Models 763 NA and the new 201-1. Both are NTSC or PAL compatible. The 201-1 adds a built-in sync generator and blanking mixer.

Don't you delay in getting full information. Write.

We create change

ASACA

ASACA CORPORATION OF AMERICA
1289 Rand Road, Des Plaines, Ill. 60016
Phone (312) 298-4380

*Product of SHIBASOKU—sister company of ASACA

For More Details Circle (10) on Reply Card

cetec broadcast group

The Cetec Schafer 7000:

Microcomputer power, unlimited versatility, and solid state reliability

Cetec Schafer's powerful new 7000 system brings a new generation to radio program automation. It's a major advance by the world leader in automation systems (with nearly 1000 operating systems in the field).

The 7000 is a complete system now, and it's expandable for tomorrow. You won't replace the 7000 with another system — you will simply expand it, with plug-in firmware boards from Schafer. Five years from now, the 7000 will still be state-of-the-broadcast-art!

Computer power designed exclusively for radio station operations

The third-generation multiprocessor 7000 gives you all the computer power you'll ever need, not only for advanced program automation, but for future station-related assignments.

This microcomputer system and its firmware are *dedicated* to automation and station operations. That means you have instant access to a great automation system at any time, but you're not paying for a lot of unused general-purpose computer time.

Talk to the 7000 in English; it answers you in English

Our video terminal displays information in plain English (with a broadcast accent). You instruct the 7000 in everyday language; it answers you in everyday language — not in "computerese."

The CRT terminal has a customized and color-coded keyboard that's fail-safe — you can't mis-program it by accident.

Take a terminal home for dinner

The 7000 can handle more than one CRT terminal at the same time. You can instruct the system minute-to-minute in the control room, while the program director is editing follow-on programming from his own office!

You can even keep a terminal in your den at home, and monitor the events as they hap via telephone and modem hookup.

The audio is extra-clean: isn't that what you're selling?

The 7000 produces super-clean sound — after all, that's the end-product your listene receives. Beginning with our own Audiofile I the 7000 can handle 16 different audio sou (and that's expandable to 64).

The 7000 is ready to grow when you are

Starting with a basic 1000-event memory 7000 is expandable to 10,000 events, a thou sand at a time.

There are separate channels for addition CRT's; there's a real-time clock option, and others for phone lines, modems, and loggin systems. With the phone-line and modem lin Cetec Service Engineers can diagnose any irregularity in the system from hundred miles away!

The 7000 challenges broadcast creativity. Yours.

Radio program automation is for technica precision, freedom from error, cost-effectiv ness, and improved profitability.

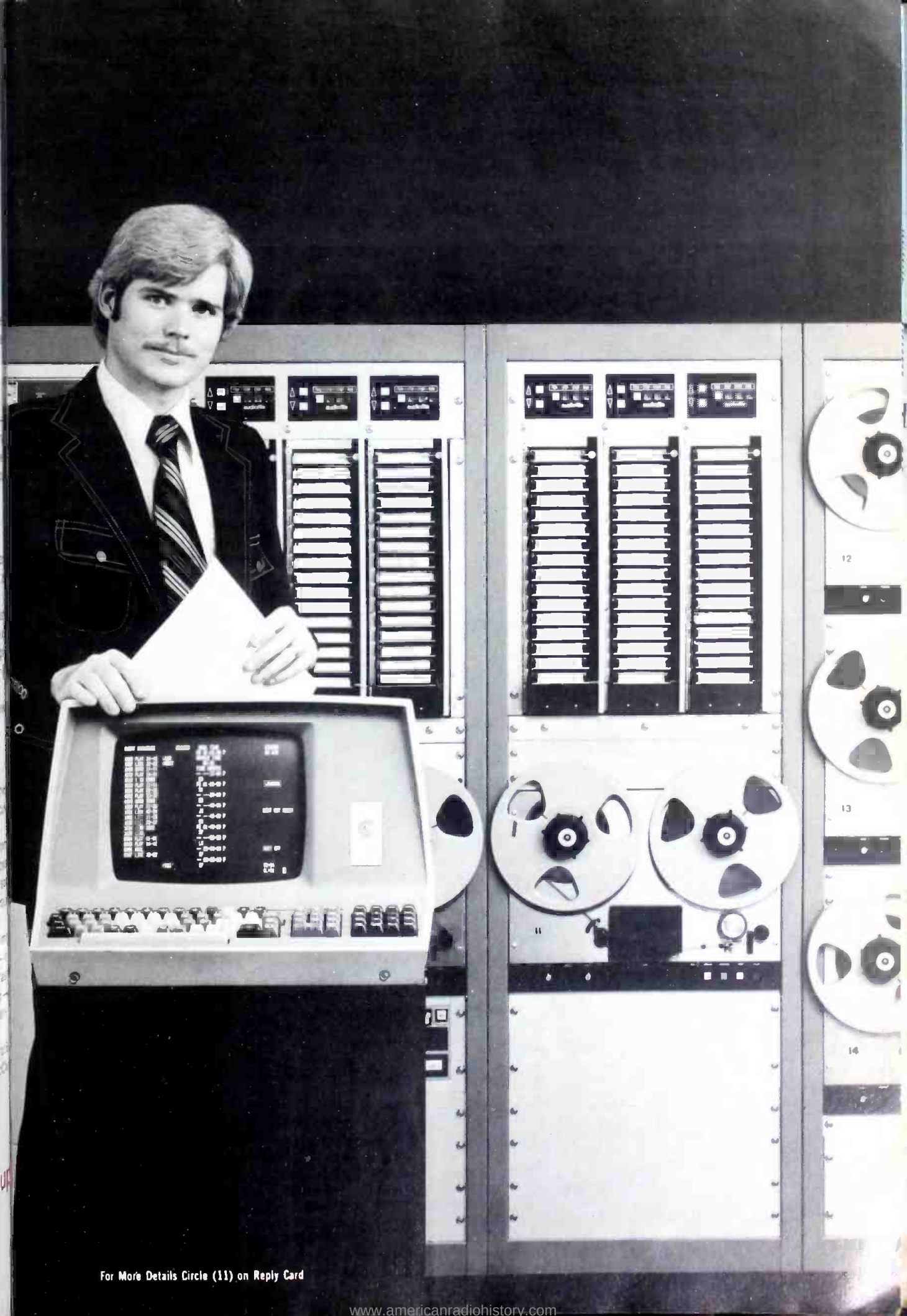
It is also for freeing news and entertainm talent for more productive work than babysi building a winning sound and station persona ality; and for adding depth and color to your broadcast day.

Cetec Schafer's 7000 has an almost limit capacity for following your commands — in stantly, accurately, flexibly, and with an ast ing memory. Tell it what you want it to do — and spend your own time on creative man-agement.

For technical specifications and operatic information, write or telephone Andy McClu today (805) 968-1561.

Cetec Broadcast Group

The Broadcast Divisions of Cetec Corporation
75 Castilian Drive, Goleta, California 93017



For More Details Circle (11) on Reply Card

continued from page 12

Inquiry begun on conversion of AM radiation patterns

The possible conversion of authorized directional antenna patterns to ones which could be computerized, in an effort to simplify engineering studies required in processing AM applications, is the subject of an FCC inquiry.

The commission adopted new rules governing the design of radiation patterns for AM stations with directional antennas in 1971. Subsequently, Section 73.150 was amended to provide for a defined method of calculation of radiation patterns that could be computerized; these patterns are called "standard patterns."

In addition, Section 73.152 was amended to provide for the use of modified standard pattern to take into account deviations from the standard pattern when the directional array had been constructed and put into use. Recently, some minor changes were made in the method of calculating standard patterns.

The requirement of using a standard pattern applies only to applications for new stations and major changes in existing stations, however. As a result, the FCC said few stations actually have standard patterns instead of those using theoretical patterns with MEOV (Maximum Expected Operating Values).

According to the FCC, the number of pending AM applications has increased dramatically since it adopted the standard pattern rules; this provides a strong incentive to find new methods of streamlining the processing of applications. One such method would be increased computerization of the processing.

The FCC said that if all domestic stations were converted to standard patterns, the savings in processing time would be significant both for it and for applicants. Neighboring countries also would receive some benefits, since they would no longer use MEOV in their calculations concerning U.S. stations, it added.

Although processing time would be saved if all patterns were standard, there are still certain problems that must be considered before concluding all stations should be converted. For example, if all were converted, the predicted service areas and protection from predicted interference would be increased for some but decreased for others.

However, the FCC said the benefits to be derived from the simplification of the overall allocation process would outweigh the shifts in interference and service areas since these shifts would occur primarily on paper.

More than 2,000 patterns would have to be converted. This would involve: recalculation and replotting; checks for accuracy; and notification to foreign governments in accordance with international agreements.

The commission has invited comments on several methods of implementation, such as conversion being performed entirely by FCC staff, conversion being performed entirely by licensees; conversion being contracted out; or some combination of these methods. Comments are due January 23; replies February 22.

continued on page

WE GET INVOLVED

Some suppliers want you to serve them. You know the type. All they're interested in is getting the order. Don't bother them with any problems. We know because this kind of supplier calls on us, too.

But we don't operate that way. We get *involved*. We'll work with you to solve your most vexing audio problems. If one of our standard systems won't do the job, we'll custom-engineer one that will.

We've been providing service like this for a long list of customers worldwide for more than 10 years. Now we're ready to do it for you.

AUDIO DESIGNS AND MANUFACTURING, INC.
16005 Sturgeon, Roseville, Michigan 48066
Phone: (313) 778-8400, Cable: AUDEX, TLX-23-1114

DISTRIBUTED OUTSIDE U.S.A.
BY AMPEX INTERNATIONAL OPERATIONS, INC.

news

continued from page 16

FCC 1974 Fairness Report affirmed

The U.S. Court of Appeals for the District of Columbia has affirmed the FCC's 1974 Fairness Report, which exempts product commercials that do not "obviously and meaningfully address a controversial issue of public importance" from fairness doctrine obligations.

The federal appellate court also affirmed the commission's decision to continue its policy of case-by-case consideration of fairness complaints, as well as its policies relating to licensee consideration of editorial advertisements, news slanting, and political editorializing.

However, the court pointed out that the fairness doctrine imposes a two-fold duty: broadcasters must devote a reasonable amount of time for the presentation of programs devoted to the discussion and consideration of public issues; and, coverage of these issues must be fair in the sense that it provides an opportunity for the presentation of contrasting viewpoints.

To clarify this point, the co remanded the Fairness Report to t commission for further inquiry i two previously rejected propos designed to overcome the difficult of current fairness doctrine e forcement. The proposals we issued by the Committee for Op Media (COM), and by Henry Gell an intervenor in the case.

COM had suggested a syst whereby licensees would devote specified percentage of their bro cast time to what COM called "f speech messages" and other pub issue programming. This would h been an alternative to curr fairness doctrine enforcement p cedures.

Henry Geller urges the adopt of a requirement "that the licen list annually the ten controver issues of public importance, lo and national, which it chose coverage in the prior year, set u the offers for response made note representative programm that was presented on each issu

Several difficulties with the C access proposal were noted by court. These included the fact there is no absolute assurance the issues addressed during aco time would be the most importan controversial issues facing the censee's community, and even assurance of balance in prese tion of opposing viewpoints.

FCC issues television-interference handbook

The FCC has published a handbook providing low-cost remedies for the more commo interference patterns.

The handbook, "How to Ide and Resolve Radio-TV Interfere contains step-by-step instruc and diagrams for each remed technical section is also include case the remedies do not resolv interference and internal mod tion of the TV set is required internal modification to TV s dangerous and must be done qualified service technician.

According to the FCC, 83% TV-interference complaints a lated to CB radios. To help r these problems, the handbook special section for the CB ope

A list of additional source assistance is included in the b the handbook.

To order "How to Identif Resolve Radio-TV Interference a check or money order for $1 Consumer Information Center, 051F, Pueblo, Colorado 8100

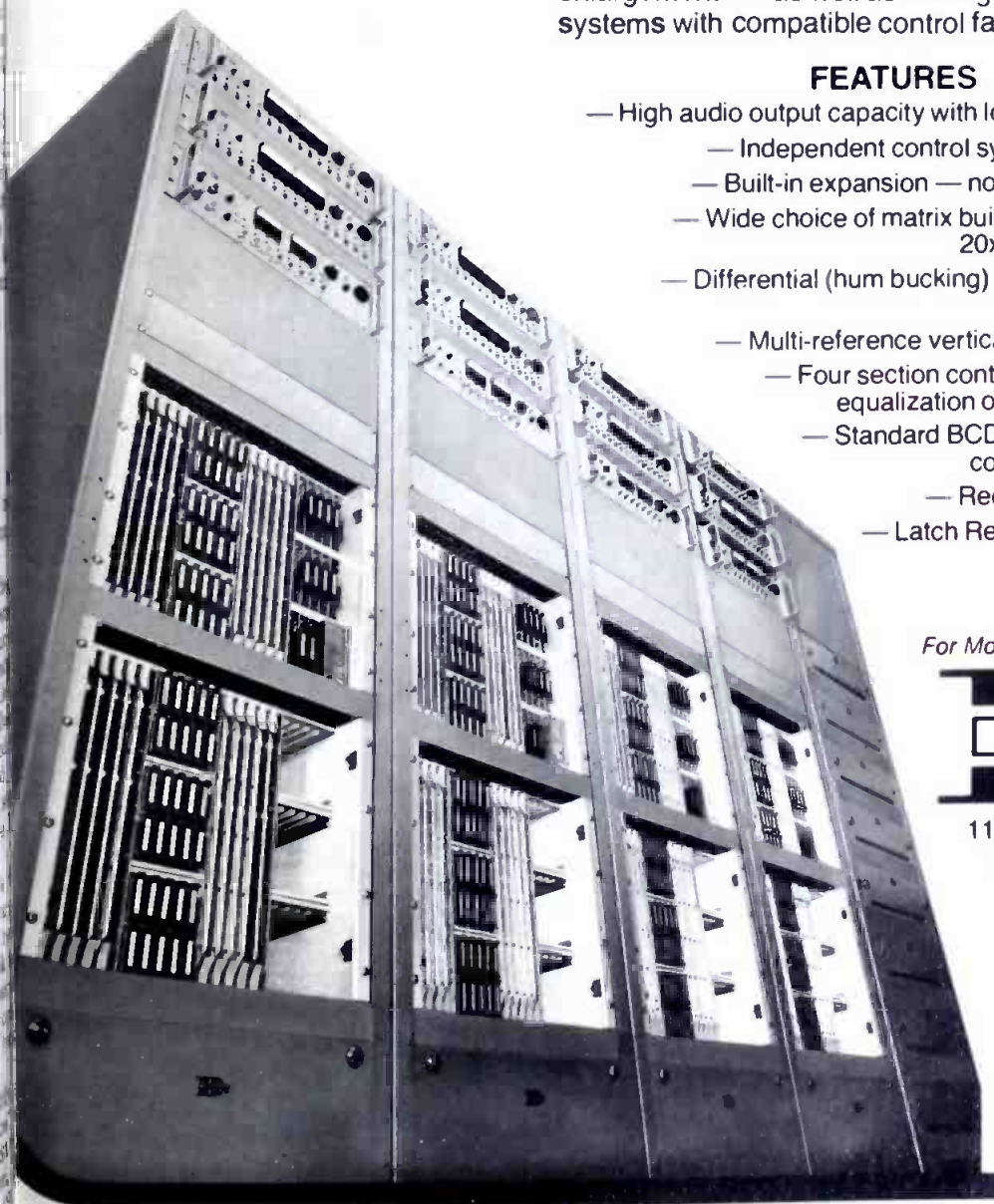
THE BETTER WAY

Datatek

ROUTING SWITCHER SYSTEMS

- ☐ Video-Audio Switching Systems
- ☐ Additional Audio Levels
- ☐ Video-only Switching Systems
- ☐ Audio-only Switching Systems
- ☐ SMPTE Time Code Signal Switching Systems
- ☐ Source-oriented Assignment Systems

Look to Datatek for all your routing switcher needs. We manufacture a high quality system to satisfy your initial requirements, with built-in expansion provision for future enlargement . . . as well as routing switcher-related systems with compatible control facilities.



FEATURES

— High audio output capacity with low noise (dynamic range)

— Independent control system for each output bus

— Built-in expansion — no group switching required

— Wide choice of matrix building block size — 20x10, 20x15, 20x20, 30x10, 30x15

— Differential (hum bucking) bridging video inputs with high return loss

— Multi-reference vertical interval video switching

— Four section continuously adjustable cable equalization on both inputs and outputs

— Standard BCD positive logic, computer-compatible control systems

— Redundant Power Supplies*

— Latch Retention Battery Supplies*

*Optional

For More Information, write or call

DATATEK CORP.

1166 W. CHESTNUT ST.
UNION, N.J. 07083
(201) 964-3656

Other Advanced Datatek Products:
TV Transmitter Color Phase Equalizers and Waveform Correctors, Video Sweep Generators, Envelope Delay Measuring Sets, and Distribution Amplifiers for video, pulse, audio and SMPTE time code signals

For More Details Circle (14) on Reply Card

In real time, it's the best helical. In slow motion, it's the only helical. VPR-1.

npex has the first one-inch helical VTR er produced that records and plays back oadcast quality material in real time, slow otion or still frame.

VPR-1 is a High Band Color recorder signed to deliver the finest audio and deo program material. Totally new signal ncepts elevate the VPR-1 far above her helicals.

l The real magic, though, comes from the tional Automatic Scan Tracking (AST) cessory. AST delivers slow motion and ll-frame material, directly from tape, thout a noise bar. And AST means abso- e tape interchange, even across wide tremes of temperature and humidity. The tures are sharp, color true, and just the ket for special effects and instructional ograms. AST even helps in post produc- n editing, where the touch of a finger unfolds a frame at a time in the manual jogging mode.

You'll want to add a TBC-1 digital time base corrector to your VPR-1 system; it's the only TBC on the market that can handle AST special effects work.

A companion unit, the new VPR-10 portable one-inch recorder, takes a full hour of battery-powered material in the field, automatically back-spaces every shot for a a smooth assemble edit, and provides audio and video verification playback. VPR-10 tapes are compatible with VPR-1 tapes, so you can take advantage of all VPR-1 special effects capability.

It's been a long wait for a broadcast quality one-inch system with full special effects, but the wait is over. VPR-1 takes you all the way down to a frame at a time.

AMPEX

Ampex Corporation, Audio-Video Systems Division, 401 Broadway, Redwood City, California 94063, 415/367-2011.

For More Details Circle (15) on Reply Card

news briefs

RCA, Sony sign sales agreement

RCA Broadcast Systems has nounced that a sales agreement been reached with Sony. Under agreement, RCA will market So 1-inch line of non-segmented vi tape recorders. Involved are BVH-1000, BVH-500, and accesso such as the BVT-1000 digital t base corrector.

This equipment will be marke under the RCA label, and receive product support from R including spare parts, field gineering, and customer train seminars.

RCA will continue to market Bosch segmented helical scan corder.

IVC continues operation

International Video Corporat with management and techni support from Video Logic, is nov full production, having cut its de almost in half since June. Roy Woodman, IVC president, and executives from Video Logic vided the money and talent convince IVC's primary credit to rebuild the company. IVC located in Sunnyvale, Californ service centers are available Sunnyvale and Chicago, with f service engineering support in N York and Atlanta.

UHF coalition funds study to improve antennas

The Public Broadcasting Servi Corporation for Public Broadcasti and the Council for UHF Bro casting have commissioned Georgia Institute of Technolo Atlanta, to measure the p formance of UHF receiving tennas. According to David Sillm manager, engineering planni PBS, "The purpose of the study is provide guidance and support to industry in the establishment technically sound uniform standa for the measurement of UHF ceiving antennas."

Eugene station ousts union

Station employees at KEZI-TV Eugene, Oregon, have voted out International Brotherhood of E trical Workers, the Oregon Bro caster reports. The 24 employ eligible to vote included member the news department, technici and production workers.

Don't settle for ENG-Only!

LDK-11 is an ENG and EFP Camera.

is the unique Philips camera that arted everyone thinking ENG *and* eld Production. The one camera at does *both* without compromising ıality or operational features. One the many innovations that has rned Philips its reputation as "the NOVISION company."*

ith *exclusive* Philips design and perrmance, the LDK-11 outperforms ose "mini" and "micro" ENG-Only meras. It is lightweight, battery or C powered, totally portable and sy-to-operate for ENG; with full proıction control either remotely or at e backpack. Yet the LDK-11 corporates the Philips picture-deterining features that *go into our most dvanced studio cameras.*

Plus...the LDK-11 includes many ldditional unique features for difficult eld production and ENG applitions. Here are just a few:

- Outstanding low-light performance; 6 to 12 dB additional gain to match specific requirements down to 8 ft. candles.
- Bias-lit Plumbicon™ tubes for lowest lag.
- Lowest Delta T permits high ambient temperature operation.
- Ultra stable gamma circuitry for true color rendition down to black.
- Switchable gamma to .35 provides contrast compression.
- Production gen-lock capability up to *3000 feet.*
- New ⅔" Plumbicon tubes with studio camera resolution.
- Up to 300' of ½" cable between camera head and backpack.
- Carry head only. Ideal operator's weight (14 lbs. with 10:1 lens).
- Change head-to-backpack cable length without adjusting registration or set up.
- True broadcast quality (27 MHz) 2-line contours with coring and combing for maximum sharpness and minimum noise.
- Magnetic shielding as in studio cameras.
- Optional 5" viewfinder.

The broad application of the LDK-11 in studios, documentaries, sports, local spots *and* ENG confirms that broadcasters need—and want—more than just an ENG camera. Prove it for yourself. For more information or a demonstration of the LDK-11 call your local Philips representative or contact Philips Broadcast Equipment Corp., 91 McKee Drive, Mahwah, N.J. 07430 (201) 529-3800.

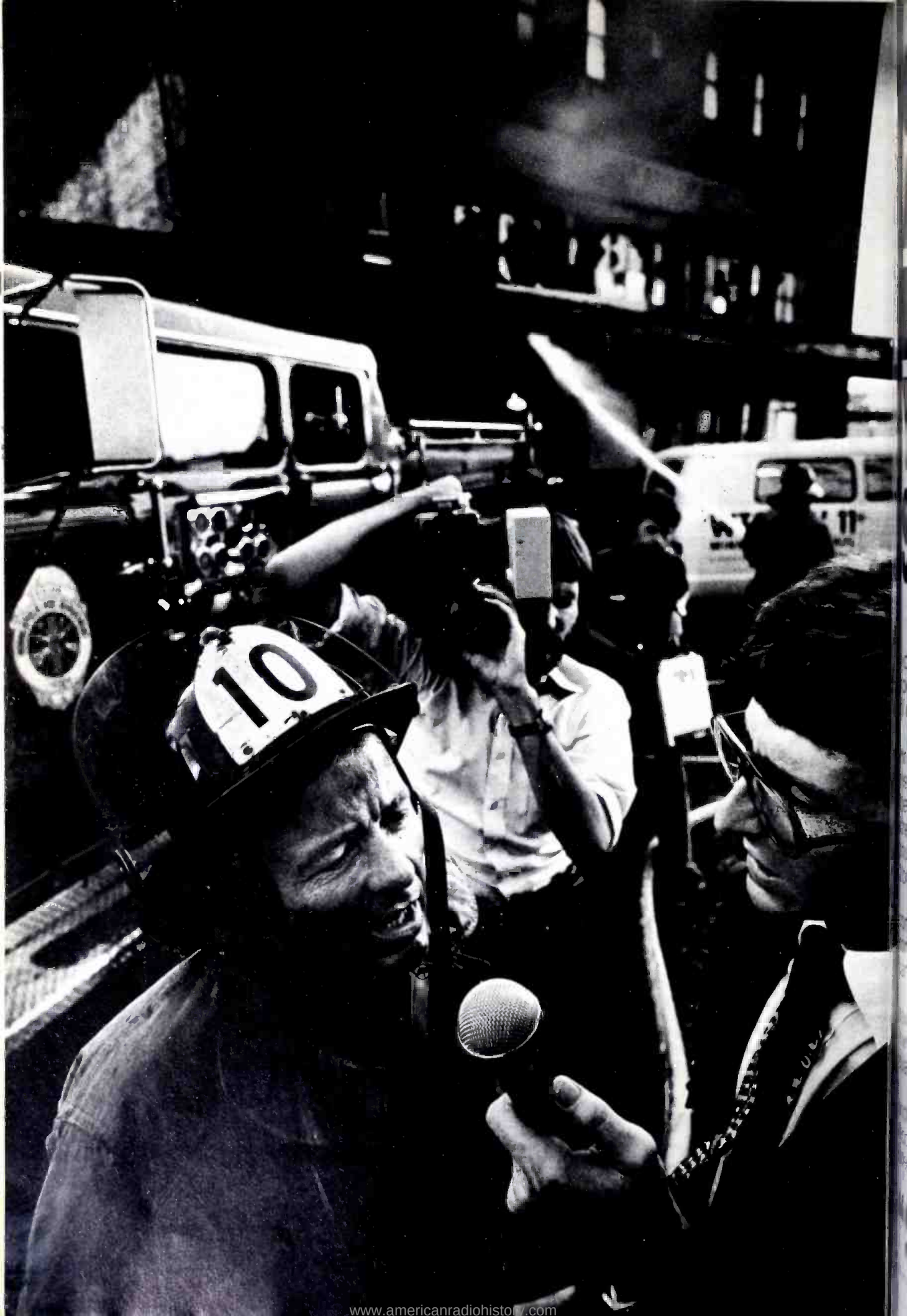
the INNOVISION company*

**Innovative Leader in World Television.*

PHILIPS®

*TM-N.V. Philips

For Literature Only Circle (17) On Reply Card
For Demonstration Only Circle (87) On Reply Card



ONE THING ABOUT THE NEWS BUSINESS: YOU NEVER GET A SECOND TAKE.

Here's a videocassette made for the people who make the news.

It's the new "Scotch"® Brand Master Broadcast U-Matic ideocassette. MBU for short. The first ¾" videocassette designed pecifically for tough ENG recording and the repetitive stress f editing.

We took the same high energy oxide videotape you've used or years and fused it to an incredibly strong backing. The esult is a videotape that won't twist, tear or jam in he field. An unyielding videotape that won't tretch under the strain of tape editing's huttling modes or degrade in extended top motion.

And to protect it even under the worst onditions, "Scotch" MBU videotape omes packed inside a high impact artridge.

Of course, "Scotch" MBU videocassettes ave the same high signal-to-noise ratio and ow headwear and dropout rates of our superb uad tapes.

So if you've ever worried about a good story nd a videocassette breaking at the same time, ecord on "Scotch" Master Broadcast U-Matic ideocassettes. They'll always back you up.

"Scotch" MBU Videocassettes.

For More Details Circle (18) on Reply Card

people in the news

Radio/Television

Norman Davis is the newest board member of Florida Association of Broadcasters. Born educated in Florida, Davis is the area vice presi of Post-Newsweek's WPLG-TV.

Larry Messick was appointed sales manager at K in Pendleton, Oregon. He had been a salesman KGRL/KXIQ in Bend, Oregon. **Scott Hendricks** returned to KTIX as program director. He previo worked at the station while attending college.

New president of the Nebraska Broadcast N Association is **Rhonda Maddox**, KCSR in Chadron. association, organized October 15, is open Nebraska broadcast station news department m bers.

SPAIGHT

STEINER

WEINER

Tom Spaight has been named chief engineer at KR Radio, Iowa City, Iowa. Spaight joins KRNA after years as chief photographer for the Washington (D News Bureau of the Storer Broadcasting Compa His responsibilities will include maintaining 24-hour-per-day FM broadcast service provided southeast Iowa, as well as news duties.

Edward Anderson Wheeler, president and founde of WEAW and WOJO Radio, Evanston, Illinois died November 25 at the age of 55 after a extended illness. Beginning his career as a announcer for KPPC in Pasadena, Californi Wheeler established Evanston's first radio statio WEAW-FM, in 1947. During the early years WEAW's operation, Wheeler pioneered in sto broadcasting and multiplexing, two new concep in broadcast technology. He was a member of th Radio Advertising Bureau, the FM Developme Association, the Radio Management Club, an former board member of the National Associatio of Broadcasters.

Manufacturers/Distributors

As director of marketing for A P Products, **Edward Steiner III** will supervise all product marketi advertising, and public relations for the compa line of electronic hardware and flat cable/conne systems.

Video Magnetics, Inc. has announced the appointm of **Gloria Weiner** as sales engineer. **Dean Leeson** *continued on page*

If you want Plumbicon* picture quality from your ENG camera– specify Plumbicon TV camera tubes.

As predicted, the Plumbicon ⅔-inch camera tube changed the entire course of broadcast journalism and helped make ENG the world's most important medium of information.

Amperex

TOMORROW'S THINKING IS TODAY'S PRODUCTS

A NORTH AMERICAN PHILIPS COMPANY

AMPEREX ELECTRONIC CORPORATION, SLATERSVILLE DIVISION, SLATERSVILLE, RHODE ISLAND 02876 • TELEPHONE: 401-762-3800

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

For More Details Circle (20) on Reply Card

people in the news

continued from page 26

Jack Tolvanen will be jointly responsible for sal throughout the U.S.

Richard P. Boyd is the new director of marketing f Chyron's video products division. Boyd has been in t marketing area of the electronics industry for the pa 20 years, and brings to the company an in-dep knowledge of the video industry and its uniq distribution requirements.

Also at Chyron, **Don P. Cadora** has been appoint director of sales for the telesystems division. Cado will be responsible for all domestic sales of titling a graphics equipment to the broadcast, industria educational and OEM markets.

BOYD

CADORA

YOUNG

H. Michael Smith has become earth station produ specialist in Scientific-Atlanta's cable communicatio division's sales department. He will be located Atlanta and will provide support for Scientifi Atlanta's sales representatives and customers in t Northeast, Midwest and Western regions.

In related action at Scientific-Atlanta, **Charles Ste Young** has been elected vice president-instrument tion. Young will be responsible for product develo ment, manufacturing and marketing of the company instrumentation products. He also will supervise t company's New Jersey division and the marketi activities at several U.S. and international sal offices.

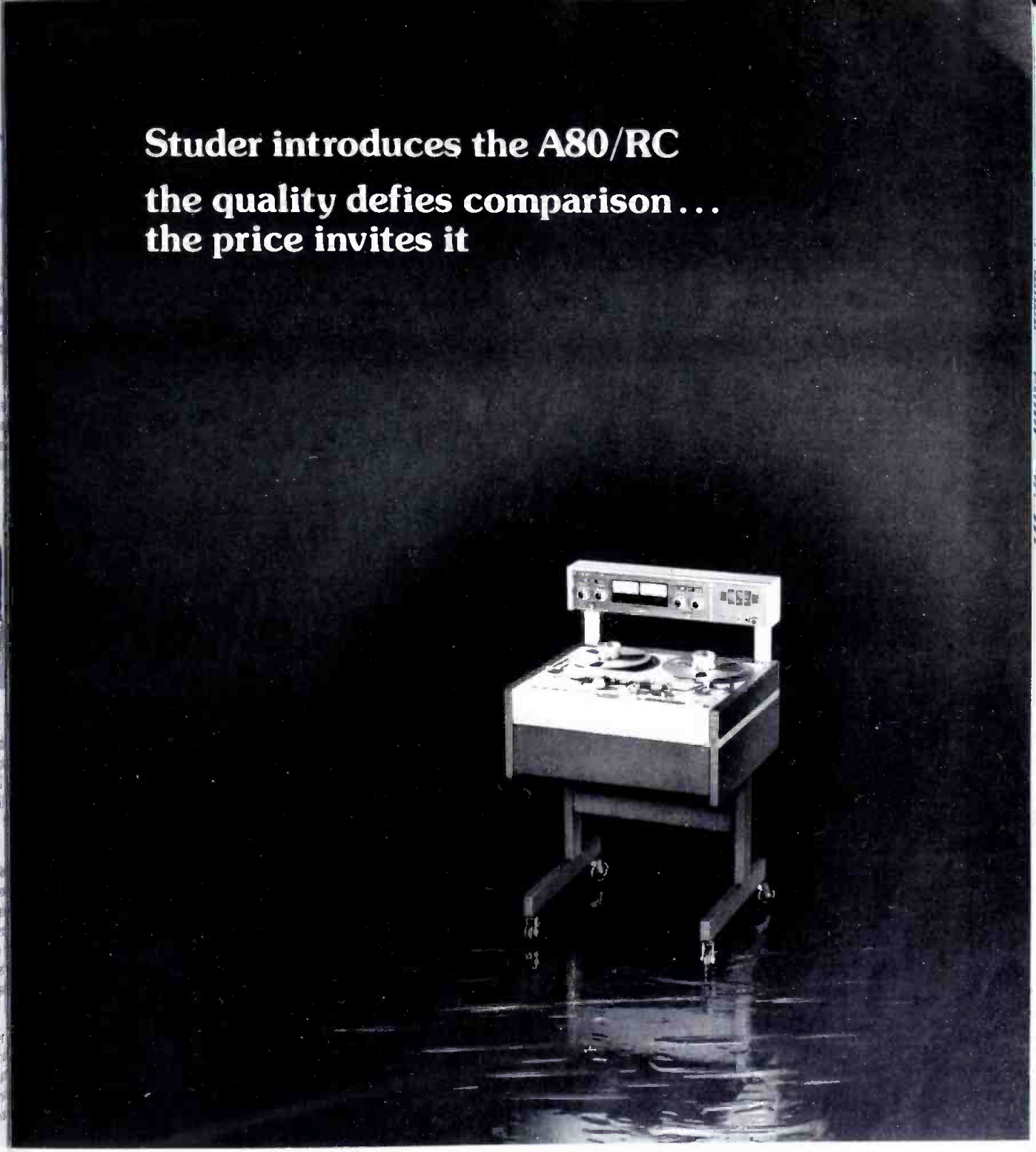
Perry Vartanian, Jr., recently appointed manager manufacturing operations of Ampex's audio-vid systems division, will direct the operations of man facturing facilities in Colorado Springs, Colorad Juarez, Mexico, and three operations in Sunnyval California.

Karol Freed has been promoted to the newly creat position of vice president, engineering, at Unimed Corporation. Freed previously was chief enginee Prior to joining the company, he held engineeri management positions with Bell & Howell and Ampe

Robert E. Leach is the new product manager, tel vision transmitter products, at Philips Broadca Equipment Corporation. Prior to joining Philips, Lea was director of engineering at WDAU-TV, Scranto Pennsylvania. He is a member of the Broadca Pioneers, SMPTE, IEEE and AFCCE.

Charles L. Martin has been named district manag for Micro Consultants, Inc. His area of responsibili includes California, Nevada and Arizona.

Studer introduces the A80/RC
the quality defies comparison...
the price invites it



From now on you don't have to pay more money to get Studer quality. The new Studer A80/RC two-channel recorder costs the same as or less than two of the other three popular names.

It sounds unbelievable. And it is the most perfect machine you can buy for any two-channel application you can think of.

Because nothing but a machine created by Willi Studer records, plays, handles, and lasts like a machine created by Willi Studer.

Now you have a choice: you can pay less for an A80/RC and get more tape recorder, or pay more for another brand and get less tape recorder.

Visit Studer for a hands-on experience with the A80/RC or for full information, call:

STUDER REVOX

or Revox America, Inc., 1819 Broadway, Nashville, Tennessee 37203 / (615) 329-9576 • In Canada: Studer Revox Canada, Ltd. / (416) 423-28

The condenser microphon system that doesn't stop with the microphones. Electro-Voice System C.

It's many systems in one. A system of systems with interchangeable components, developed in the real world of the audio professional. Electro-Voice System C groups four high-performance condenser elements with two versatile preamps. And we know that a microphone is virtually useless to a professional unless accompanied by support equipment that works. That's why we sell these microphones in...

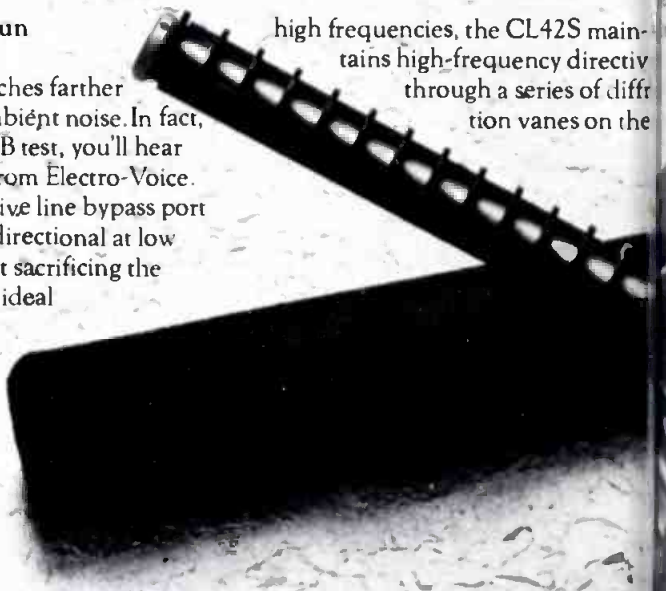
Packaged Systems.

Everything the professional needs with his microphone is included with the individual mike in a rugged, foam-lined case. Windscreens, shock mounts, and even a handle for our shotgun mike. And it's like getting all the "extras" free, because Electro-Voice packaged systems sell for about the same price as our competitor's mikes alone.

System C offers these four packaged systems—each, a ready-to-use, complete system.

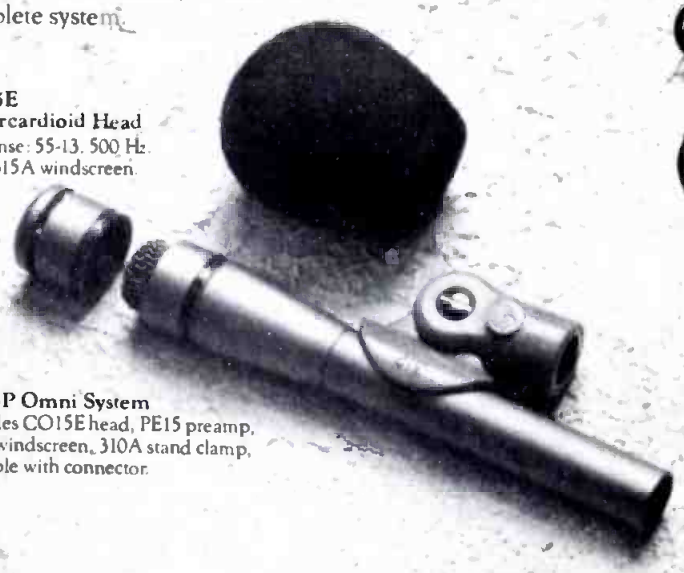
The CL42S Shotgun System.

Our shotgun reaches farther and rejects more ambient noise. In fact, on a side-by-side A-B test, you'll hear less ambient noise from Electro-Voice. It features an exclusive line bypass port that makes it more directional at low frequencies, without sacrificing the frequency response ideal for boom use. And unlike other shotguns which get very narrow at high frequencies, the CL42S maintains high-frequency directiv through a series of diffr tion vanes on the



CH15S
Hypercardioid System
Includes CH15E head, SE15 preamp, 315A windscreen, 304 mini-shock mount.

CH15E
Hypercardioid Head
Response: 55-13, 500 Hz.
With 315A windscreen.



CO15P Omni System
Includes CO15E head, PE15 preamp, 315A windscreen, 310A stand clamp, 15' cable with connector.

CS15P Cardioid Syste
Includes CS15E head, PE preamp, 315A windscreer 312A stand clamp, 15' cab with connector.

CO15E Omni Head
Response: 20-20,000 Hz
With 315A windscreen.

tube. Maintains sibilance if the ent" gets a bit off-mike.

e CH15S Hypercardioid System.

t's two extreme nulls—in excess of B at 120° off axis—create a tighter tal pickup pattern than conven- al directional microphones. We're ially more directional than a "mini" gun mike, in a package half the . And our element and preamp e designed together for boom and pole use. Lightweight. Under ches long. Compatible with ntom and AB power. And all with ady-to-go shock nt.

The CS15S Single-D Cardioid System.

It loves the stage, has the best gain-before-feedback in the business, and puts sex appeal in any singer's voice with its bass-boosting proximity effect. And the shaped high-frequency response makes the CS15S equally at home in the recording studio. The phantom powerable preamp has wide-band response and high sound pressure level capabilities (140dB SPL for 1% THD at 1kHz)—ideal for the most demanding close-up vocal and instrument miking applications.

The CO15S Omni System.

It extends response to the very limits of audibility—20 to 20,000 Hz. Response that registers the deepest sonorities of a great pipe organ, mirrors all the subtlety of solo instruments. Does full justice to a symphony orchestra. And unlike even the most highly respected omni's the CO15S is truly omnidirectional at the very highest frequencies. Provides a spectral balance faithful in both close-up miking and distant pickups.

Electro-Voice includes all four of these high-performance, packaged systems in its...

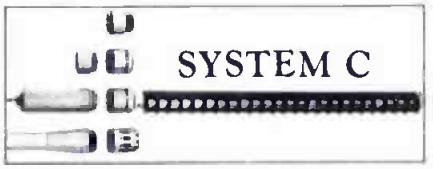
Exclusive Warranty System.

Electro-Voice backs up its System C with the only unconditional warranty in the business: for two years, we will repair or replace your System C microphones at no charge—no matter what caused the damage!

We can do it because System C, with its structural integrity through turned-steel cases, and positive mechanical nesting of internal components, more than meets the E-V standards for ruggedness. You'll experience less down-time, and prompt service if anything does do wrong. Prompt because we don't have to send things back to Europe for repair. Prompt because our modular design simplifies repair. Prompt, because we care.

We don't think the professional should accept anything less.

For complete information including an in-depth technical paper on Electro-Voice System C, just write to: Electro-Voice, Inc., 600 Cecil Street, Buchanan, Michigan, 49107



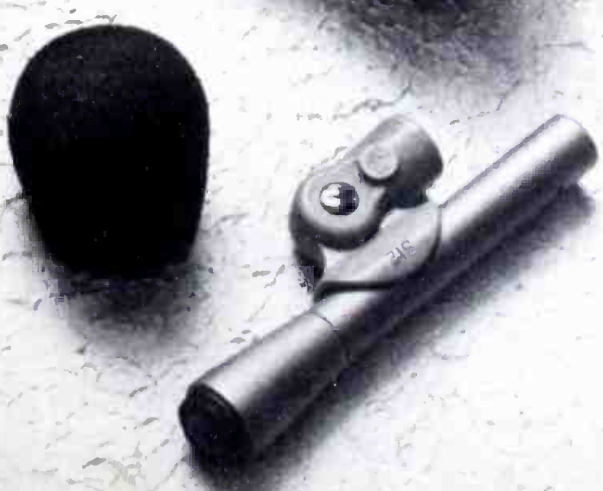
Electro-Voice®
a gulton company
600 Cecil St., Buchanan, Michigan 49107

2S Shotgun System
des CL42E Cardiline® head, preamp, 343 windscreen, hock mount.

BS9
Remote battery power supply.

SE15 Preamplifier
For boom or fishpole use.

10 Attenuator



PE15 Preamplifier
For stand or hand-held use.

SMPTE conference spotlights digital TV, video still store, and 1-inch videotape

Sheraton-Atlanta Hotel, Atlanta, Georgia, February 3-4, 19

The 12th Annual Television Conference of the Society of Motion Picture and Television Engineers (SMPTE), set for February 3-4, will feature two days of technical sessions on digital television, video still store, and 1-inch videotape recording. The conference is to be held at the Sheraton-Atlanta Hotel in Atlanta, Georgia.

The local-arrangements chairman for the conference is Eugene Myler, Eastman Kodak Company. Program chairman is Richard Streeter, CBS, New York. Topic chairman for specific subject areas are Frederick M. Remley, Jr., University of Michigan, for Production Experience with Broadcast Quality 1-inch Videotape Machines; Robert McAll, Vital Industries, for Digital Video for Production Use; and Al Chismark, WTUH-TV, for Recent Advances in Video Still Store and Slow Motion.

1-inch videotape

The papers that will be presented Friday, February 3, on Production Experience with Broadcast Quality 1-inch Videotape Machines are:

An introduction and orientation, Frederick M. Remley, Jr., University of Michigan;

"Videotape Program Production at CBS Studio Center," William Connolly, CBS Television Network, New York;

"Post-production and Production Experiences with 1-inch Videotape," E. Grey Hodges, Jr., Jefferson Productions and Jefferson Pilot Broadcasting Co., Charlotte, North Carolina;

"Technical Description of Sony's Portable 1-inch Machine, BVH 500: First Discussion of its Technical Parameters," M. Morizono, Sony Corp., Tokyo, Japan;

"Post-production Experience with 1-inch Videotape," Pat Pintus, CTP, Salt Lake City, Utah;

"Operational Use of Synchronized 1-inch VTRs," John Lentz, CBS Technology Center, Stamford, CT;

"BCN Digital Store: Standalone Operations, Production and Post-Production Accessory for all Broadcast VTRs," Henry Zahn, Robert Bosch GmbH, Fernseh Group, Darmstadt, West Germany, and C. Robert Paulson, AVP Communication, Westborough, Mass.;

"Users' Experience with Type B 'BCN Helical' Portable and Studio Editing VTR" Bill Kelly, WNEW-TV, New York;

"CBS Television Network Editroom Using 1-inch VTRs," William C. Nicholls, CBS Television Network, New York;

"Proposed SMPTE Type C Helical Recording Format: A Tutorial Paper," David Fibush, Ampex Corp., Redwood City, Calif.; and,

"Mechanical Design Considerations for Helical Scan VTRs," D. Ryan, Ampex Corp., Redwood City, Calif.

There also will be a panel discussion on this topic.

Digital television

The papers that will be presented Saturday on Digital Video for Production Use are:

"Progress Report on Digital Video Standards," R. S. Hopkins, RCA, Camden, New Jersey;

"The Role of the Digital Fieldstore Synchronizer in Television Productions," J. Brian Matley, Micro Consultants, Inc., Palo Alto, Calif.;

"Recent Innovations in Digital Special Effects," J. Kenneth Moore, A. Kaiser, H. W. Mahler, CBS Technology Center, Stamford, Conn.;

"An Integrated, NTSC, Teleproduction Switching Facility, Capable of Performing 'Film Type' Optical Transitions in Real Time," Robert McAll, Vital Industries, In Hicksville, New York; and

"Frame Synchronizer Applicat in Production Switching," NE Tokyo, Japan.

Video still store

Papers scheduled Saturday Recent Advances in Video Still St and Slow Motion are:

"From Graphic Artists to Co posite Scene—The Digital Wa Robert Mausler, NBC, New York;

"A Large Scale, High Retrie Speed Holographic Still Pictu Filing System," Akito Iwamoto, shiba Research and Developme Center, Kawasaki, Japan;

"Video Slow Motion and Fra Storage Using Flexible Magne Discs," Lee Stratton, Arvin-Ech Mountain View, Calif.;

"Adda Corporation Electronic S Processor," William Hendersh Adda Corp., Campbell, Calif.;

"The Type B 'BCN' Film-st Editing System," Jurgen Heitma Robert Bosch GmbH, Fernseh Grou Darmstadt, West Germany;

"New Developments and Featu on the ESS Digital Recorder," Justus, Ampex Corp., Redwood Ci Calif.

Equipment exhibit

In conjunction with the techni sessions, there will be an equipm exhibit featuring equipment relati to the subjects of the conferen Most of the manufacturers of 1-in videotape, digital television, a video still store and slow moti equipment are expected to parti pate.

Additional information on the co ference and exhibit is availab from SMPTE Conference Dept., 8 Scarsdale Avenue, Scarsdale, 10583.

TNG

TOTAL NEWS GATHERING SYSTEM

HE ANGENIEUX TOTAL LIGHTWEIGHT-COMPACT STEM FOR ENG/EJ provides angles from super wide extreme telephoto as ll as high magnification ultra close-ups. Center- g around the Angenieux 9.5, 9.5-142mm, f/1.8 zoom ns, the system allows the meraman to carry only components which are cessary for his specific signment. All focal lengths m 7 to 615mm are avail- le with this unique sys- n, including remote control capability. Objects as small as 0.7x0.9" x22mm) can be covered while retaining zoom capability. All in a sic package weighing 5.5 lbs. (2.5kg) including servo zoom/iris and tol grip.

angēnieux corporation of america

1500 OCEAN AVE., BOHEMIA, NEW YORK 11716 • (516) 567-1800
13381 BEACH AVE., VENICE, CALIFORNIA 90291 • (213) 821-5080
4 HAVEN HILL SQ., AGINCOURT, ONT. M1V1M4 • (416) 291-2363

For More Details Circle (23) on Reply Card

ENG: The road show that keeps getting better

By Ron Merrell, *Editorial Director for Broadcast Engineering*

What's happening in ENG today? Anything new and exciting? Well, it's not exactly exciting, and the products are second- and third-generation.

As one network official put it, ENG is just a mop-up operation today. Translation: it's taken for granted that we are equipped for ENG. All we're doing now is latching down the details.

So there it is. From the top, that's about all you can say for ENG. Right? Not quite!

ENG on the road

If you travel around the country these days, at the end of the day you'll find yourself parked before a hotel TV set for the evening news. And since you've heard so much ballyhoo about ENG, you expect to see examples of how other stations present solid ENG coverage of something...anything. But then the news comes on as the same old canned approach, dashed with a good laugh on the weatherman for causing the lousy weather, snickers for the sports editor because his favorite team lost again, or a chuckle o some trivia fill news. Even the begin to look alike!

Another thing that isn't so around the news scene is t effectively splicing ENG into news requires a lot of time people-talent. It's one thing to r out, shoot a story, and eit transmit it or rush it back ready-to-go tape. It's quite anot trick to bring back something th worth bumping the happy, c fortable news scene...much l regular programming.

Creative talent is a requisite integrating ENG with the news takes talent on camera, on the m and back in the editing booth. if it's live via microwave, demand is greater. Better yet takes talent to sense when to p up and go, and when to sit it ou can be a huge commitment, so s stations have opted for using ENG equipment only for its econo And that means passing up feeds or rushing back late-brea news. ("We'll have a taped re on the 10 o'clock news.")

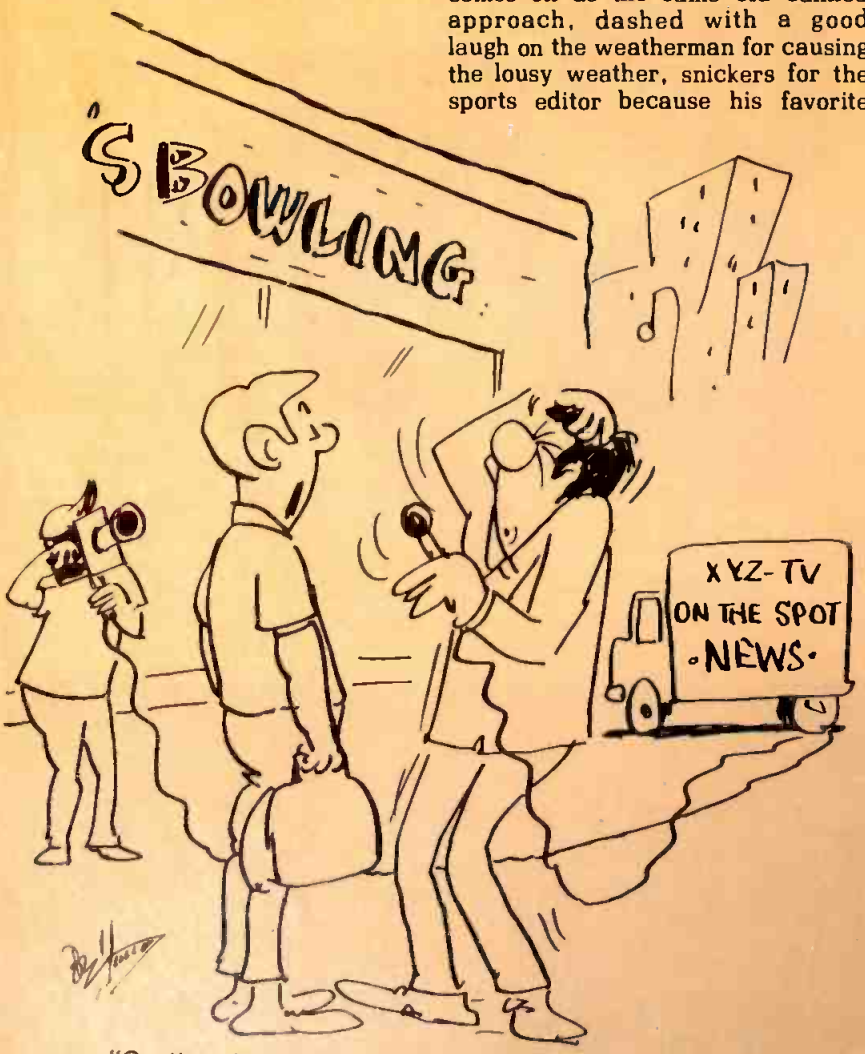
In today's market, taking advantage of ENG gear may not as important as it once was. A way, stations aimed at being firs the news ratings will make good of whatever is available, and th attract talent. And that top ta will keep them on top of the nev

A network expert in this are TV commented recently that thought ENG was held back only a lack of talent. I don't think that complicated. The challeng to develop talent, and a cut and "strictly from the news set" proach won't develop talent.

Open doors for EFP

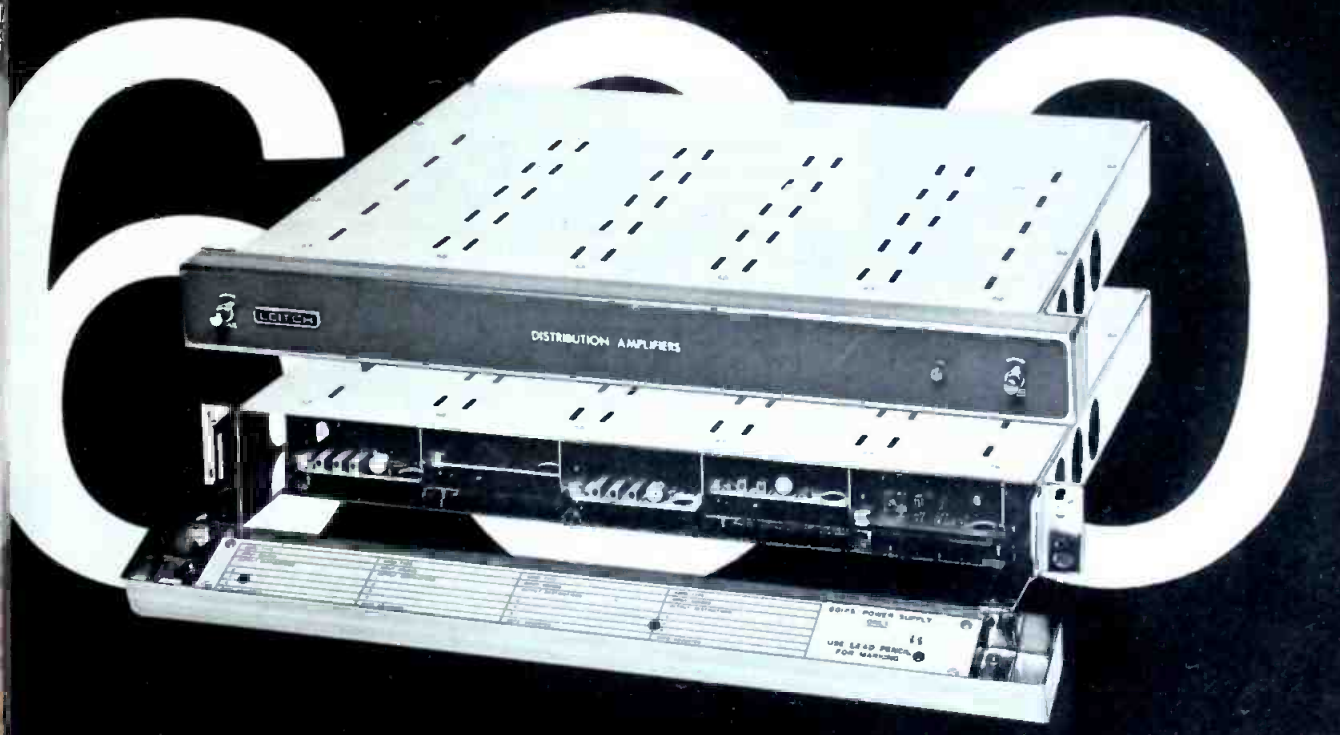
On the brighter side, many operations are shifting into tronic field production (EFP). In trial and private television, ta their key from the ENG revolu opted for producing in the f

continued on pag



"On the air or not, that's what my opponent said right after I made the tenth strike in a row."

Leitch proudly welcomes "Slim" o television's top-rated 600 Series.



rch engineers have responded to requests m fans of the very popular 600 Series. "Slim", new single rack unit FR-601 Distribution plifier frame, has been introduced, adding new level of versatility to the line-up of cessful performers.

The standard FR-600 frame accommo- es up to 10 amplifiers or delay cards, plus al power supplies. Featuring an improved ged front access panel, the new FR-601 mounting frame houses up to 4 cards with one power supply.

The new SVD-600 Switchable Video Delay module and the VCA-600 Video Clamping Amplifier are other welcome additions to the 600 Series modules.

Performance, reliability and designed versatility are all built into Leitch's 600 Series. Write to us for full details.

LEITCH

Leitch Video Limited, 705 Progress Avenue, Scarborough, Ontario M1H 2X1.
Tel: (416) 438-5060

Leitch Video Inc., 210 South 8th Street, Lewiston, N.Y. 14092.
Tel: (716) 754-4349

For More Details Circle (39) on Reply Card

ENG

continued from page 36

Feeding ideas back and forth has led to some interesting inputs. And it has brought even more kinds of equipment to the news scene.

Just as the networks demanded, equipment improvements are being introduced at every convention. The 1978 NAB, scheduled for Las Vegas in April, will be no exception.

The changing ENG and EFP scene also has accelerated generation jumps in the equipment being used. Initial entries in the ENG market were models carried over directly from the educational, industrial, and CATV fields.

Meanwhile, more than a few manufacturers have paid attention to broadcast requirements. The result is evident in cameras that can be used in the field, or as backup or studio-effects cameras. And look at the progress made in recorders (not to mention the promise of a standard 1-inch helical format). Of course it helped when TBCs became affordable, and microwave and switching techniques were massaged by R&D. Then frame synchronizers and enhancers got into the act.

The list of ENG equipment available at the scene today tells us that a lot more than news could be shot in the field. But the option that always has set ENG apart is the live via microwave report. Once again, the manufacturers have developed improved equipment, and nudge ENG forward as a reliable way to collect the news.

Looking ahead

Last month we ran a short article on a Boston radio station that used a light beam to send audio on a short-hop remote. For that station, it was a gimmick, but it did prove in a live setting that an infrared optical carrier can do the job. Admittedly, until their range can be doubled or tripled, optical links in radio will be rare events. But how about video links?

In another article in this issue, an infrared link used at KSL-TV, Salt Lake City, is described. Even at KSL, the link is a short hop. But at KSL-TV it's not a gimmick. After all, the infrared link does solve the problem of crowded frequencies. The bandwidth is enormous, and no license is required.

The bottom line for ENG today is that despite all the past excitement and innovative uses, most stat are doing little more with ENG t than replacing film equipment. W out a commitment, talented pe are not attracted to ENG, makir appear that there is a ta shortage on the news side of industry. But stations that h gone the full ENG route are fin a bonus in talent applications an electronic field production poss ities.

So what is happening in today is not that another station bought the equipment, or another station is using the eq ment to cover something unus What is happening is that EN sliding into EFP, the door at m stations is propped open for tale people, and the equipment k improving.

Enter the laser-based optical t nology, hold CCD cameras a carrot for the future, and you see that ENG (or EFP) will rema hot topic. But it also will rema tough challenge even for the inn tors. No matter how it's pitche the public, it will never help bottom line of the "me too, but barely" stations.

With ENG and EFP, the good keep getting better.

LOW LOSS CABLE BREAKTHROUGH

New LDF Series HELIAX® Cable

ANDREW

Lower loss, improved moisture barrier, plus all the traditional advantages of HELIAX foam-dielectric cable. New low density foam dielectric reduces attenuation, almost to that of air-dielectric cables. Annular corrugations, in conjunction with connector "O" ring seals, provide a positive longitudinal moisture block.

Connectors have been improved too. New features include self-flaring assembly, superior electrical contact, high resistance to pull-off and twist-off, moisture seals, and low VSWR through cable cut-off frequency.

Two sizes, 1/2" and 7/8" are available now for immediate shipment. For further information contact your Andrew Sales Engineer or ask for Bulletin 1160.

ANDREW CORPORATION
10500 W. 153rd St., Orland Park, IL, U.S.A. 60462
Telephone: (312) 349-3300

ANDREW ANTENNA COMPANY LTD.
606 Beech St., Whitby, Ontario, Canada L1N 5S2
Telephone: (416) 668-3348

ANDREW ANTENNAS
Lochgelly, Fife, Great Britain KY5 9HG
Telephone: (0592) 780561

ANDREW ANTENNAS
171 Henty St., Reservoir, Victoria, Australia 3073
Telephone: (03) 460-1544

ANDREW ANTENAS LTDA.
Av. Victor Andrew, 585, Caixa Postal 600, 18100 Sorocaba–SP–Brasil Telephone: (0152) 28900

ANTENNES ANDREW S.A.R.L.
B.P. 44, 28400 Nogent-le-Rotrou, France
Téléphone: (37) 52 19 06

ANTENAS Y PERITAJES
Av. Reforma 445 P.B.–K., México 5, D.F. México
Teléfono: (905) 525-5443

For More Details Circle (41) on Reply Card

KCST puts ENG on the set

By Michael Scheibach, Managing Editor

KCST-TV, San Diego, California, like many stations, is gradually integrating electronic newsgathering into its overall news operation. Unlike some stations, however, KCST refuses to use the mini-cam in every newscast just for the sake of having a "live eye" report.

Bill Peterson, news director, feels that ENG is the way of the future in television news coverage, not merely in "live" reports, but in electronic field productions (EFP). "We feel that ENG is the future," Peterson said, "and eventually we will have to move in that direction. But at this time, I cannot say when the total conversion will be made."

KCST currently operates seven news units, including five traditional film crews and two ENG units. The ENG systems, which have been in operation for 16 months, have proven their worth and versatility. Although there are only two units, they produce about 50% of the station's news reports.

ENG beginnings at KCST

Peterson came to KCST two years ago to transform a rather weak station, with a news staff of 10 persons and no ENG units, into a respected news operation that could compete in the San Diego television market. Today, KCST has 40 persons in the news department (with 11 technicians in the video-gathering unit) and excellent ENG capabilities.

Since another local station already had introduced ENG, Peters decided to make KCST the be equipped ENG station. After looki at several systems, he finally cho an RCA TK-76 camera, a So BV-1000 videocassette recorder, Nurad microwave system, and t complete editing systems, includi a Convergence editor controller.

The Newscenter

Another element of KCST-TV integrated news operation is t news set. At KCST, the set is t newsroom itself. This concept, c veloped by Peterson, puts the ent news operation on camera, addi realism, immediacy, and identity the news function.

continued on page

The set for KCST's evening news is the newsroom itself, with newscasters located between the former studio and newsroom. Cameras and lighting are positioned on the studio side, while the newsroom serves as the background.

'Take Me Anywhere'

That's a "no-strings" invitation from Hitachi's amazing 30 color camera. It's the first time a self-contained port- camera has packed so much quality into a lightweight, act housing that, better yet, goes for such a painless price. No wonder, then, that the FP3030 has received such an siastic reception from corporations, schools and hos-. They find it gives them unrestricted mobility in all communications and training programs. Broadcasters are utilizing the FP3030's unique capabilities for every- from at-the-scene news gathering to field documentary uction.

The FP3030's diverse current user list reflects the cam- ability to deliver results that meet the high standards erica's top communicators...in broadcast, industry, and ation. And we think that's quite an endorsement for a ra that runs less than $5,000!

A few key features of the FP3030's design: • Easy to use. Just point and shoot. • Featherweight portability; weighs only 8½ lbs. complete. • Exclusive single Tri-Electrode Vidicon tube for registration-free color. • Internal NTSC, or external sync for multi-camera system use. • 3-way power—uses AC line, battery, or external DC (12V). • Can be used with any video tape recorder from cartridge to quad.

Your authorized Hitachi dealer will be glad to demonstrate the FP3030. Write or call for the name of your nearest dealer.

HITACHI
Hitachi Denshi America, Ltd.
FORMERLY HITACHI SHIBADEN CORP OF AMERICA

ive Office: 58-25 Brooklyn-Queens Expressway, Woodside, N.Y. 11377 (212) 898-1261
es in Chicago (312) 344-4020—Los Angeles (213) 328-2110—Dallas (214) 233-7823—
Atlanta (404) 451-9453—Denver (303) 344-3156

For More Details Circle (24) on Reply Card

KCST

continued from page 40

"A viewer looks in on the actual newsroom, sees a report come in and be aired immediately. It can be very dramatic and effective," Peterson said.

When KCST's new facility was built two years ago, the Newscenter, which occupies 25% of the building's space, was designed so the wall between the newsroom and news studio could be removed.

After using the news studio for awhile, it was decided to change the format and remove this wall. Now, the Newscenter is one large room, with the newscasters sitting between the former studio and the newsroom. The newsroom provides the background, while the lighting comes from the studio side.

"Unlike the typical noise level of a newsroom," Peterson noted, "KCST's newsroom is relatively quiet as a result of careful planning. Editing rooms and teletypes are located in glass enclosures which surround the newsroom itself."

By using wireless mikes, announcers can move around room during the actual newsc which adds even more realism being "behind the scenes."

Peterson is proud of the p fessionalism and technical capa ities of the station's ENG operati "We can be on-air within f minutes of arriving on a scene, a that includes setting up, orient the microwave, and transmitting picture," he said.

ENG units

The quick set-up time is due only to the mobility of the statio two ENG vans, but to the crews t man them as well. Each van ha crew of three: camera operat microwave/tape operator, and porter. The 11-member video-ga ering unit is trained in both f technique and mini-cam operati They can handle the camer editing, production, and are lea ing film processing. When KC does make the conversion to t ENG, their technical staff will fully capable of handling the ne operation, Peterson said.

The effectiveness of the crew aided by the vans themselves, wh are completely equipped and operate continuously for 12 hours DC power. Although the vans operate on AC, if power is int rupted they automatically switch DC without any noticeable effect camera. The vans are charged e night in preparation for the n day's operation. On one occasio van operated for 14 hours on single DC charge.

One van also is equipped wit ladder which can extend the mic wave dish 30 feet above the grou This allows the remote unit to ov come hilly terrain and tall buildin and broadcast "live" back to KCS Newscenter.

Peterson pointed out that seve times the crew has mounted camera on the van ladder in or to overcome barriers or to get better angle. This has been u quite effectively in covering news the military bases in the San Di area. Whenever news happens o base, Peterson said, the milit closes the gates. When this h pens, KCST lifts its camera ab the gate and zooms in on the sce

With the microwave capability live mini-cam report can be on-air directly. Or, if the action in an area where direct tra mission is not possible, the st can be taped on site and the

continued on page

REE!

Your planning guide to a better sound

ether you're in engineering or management newest catalog will prove indispensable n planning your audio requirements.

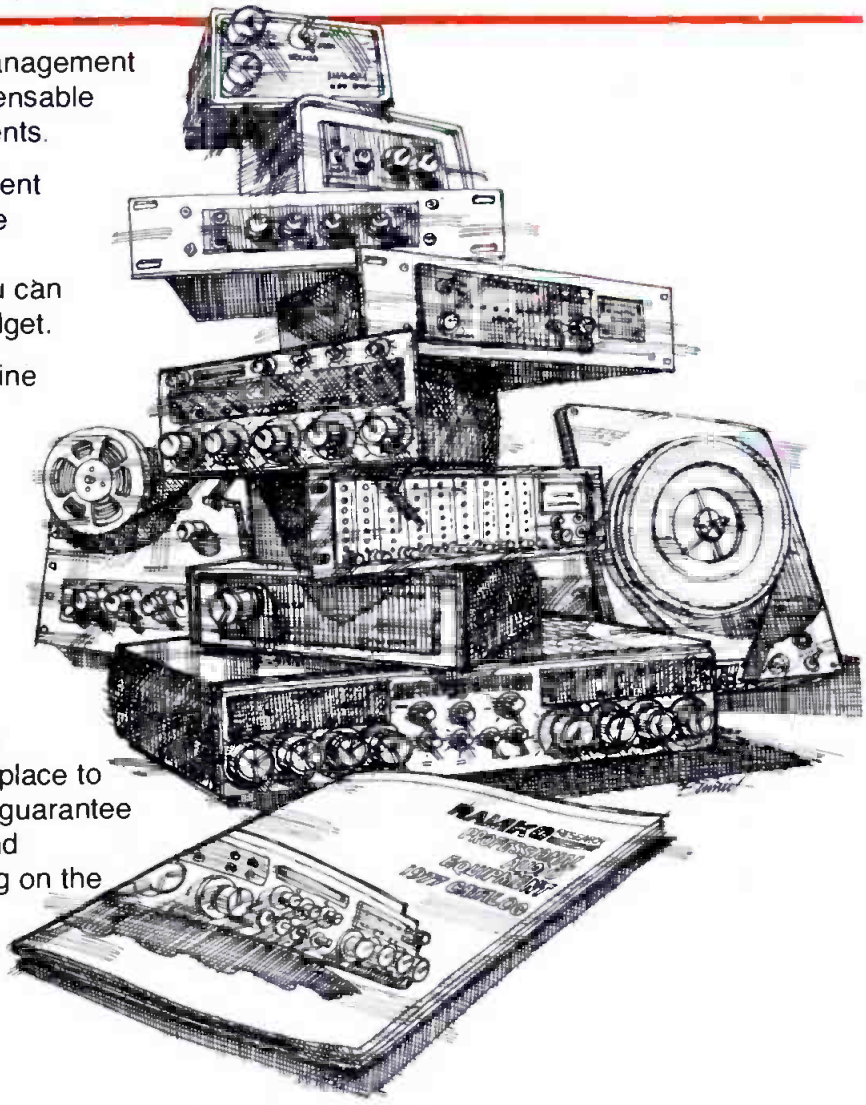
MKO manufactures over 70 different ducts designed specifically for the adcaster and those engaged in fessional Sound. All at prices you can rd, no matter how small your budget.

dio consoles, audio DA's, mic. & line olifiers, turntable preamps, ter/compressors, equalizing olifiers, tape winders, solid state ers and much more. We also ribute some of the finest nes in turntables, tape ording accessories and other adcast products.

ddition to the vast array of ducts, you'll find quality of design performance that takes second place to e and is ahead of most. And we guarantee ith our 2 week free trial period and ranties of 2 & 4 years (depending on the n).

, write, or circle the bingo card ay for your free copy of our vest 24 page catalog. The nnical descriptions, cifications and illustrations show you why RAMKO designed ipment offers the best t/performance ratio in the industry.

mko understands your needs. r all, we're broadcast engineers



RAMKO RESEARCH

11355 "A" Folsom Blvd.
Rancho Cordova, CA 95670
(916) 635-3600

For More Details Circle (26) on Reply Card

KCST

continued from page 42

The newsroom (foreground) is part of the set on KCST's evening news. New casters are free to stand or move around, adding realism to the news operatio Editing rooms (left) are behind glass to minimize noise.

moved to a location where it can be transmitted to the studio for taping or for on-air use. If time permits, the crew can return to the studio with the tape for editing.

According to Peterson, the two ENG units have been one of the major reasons for KCST's improved news coverage, making the station more competitive with the other local stations. On one election night, for example, while another station did one remote, KCST did 14 remotes with one van, and at 14 different locations.

Communications system

Another vital element in the integration of KCST's successful ENG operation is fast, reliable communications, both in the field and between the field units and headquarters. KCST-TV has installed an extensive mobile and portable communications system to accomplish this.

Each of the news crew's vehicles and the news director's car is equipped with a two-way mobile radio for direct contact with the Newscenter. The mobile radios are used for dispatching crews, providing instructions to reporters on how to handle a particular story, and receiving status reports on fie assignments.

In addition, the radios often a used to provide details on a sto while the crew is on the way ba to the studio. These reports th can be integrated into a two-minu "tease" that KCST uses immediate preceding the evening news se ment.

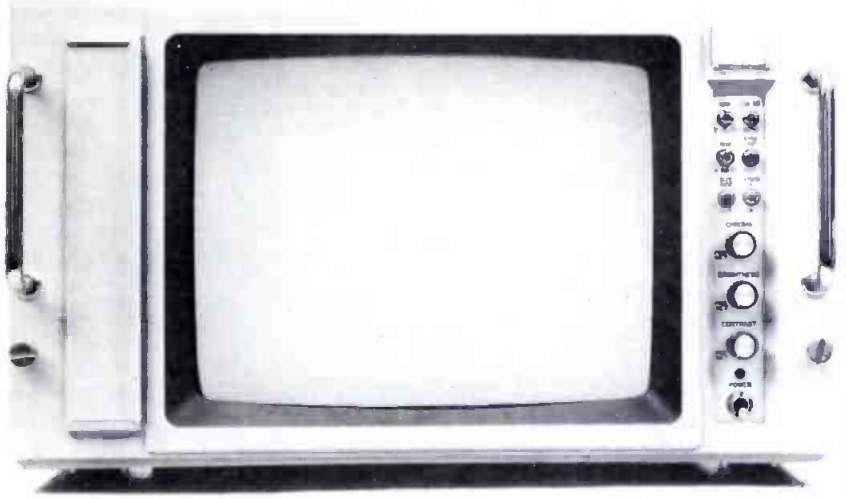
For communications on site, eac news crew is equipped with han held radios which operate on different frequency than the mobi radios. These portable units a used for technical operations, i cluding orienting the microwa dish for best reception, and f cueing reporters and camera ope ators.

Two repeater systems in the tw channel radio network extend t effective range of the communic tions system to 30 miles, dependi upon the terrain.

"Our radio network gives complete control over our crews the field, and often gives us a jum on the other stations," Peters said. "The live voice-over rad reports directly from the field durir our attention-grabbing lead-in al are proving very effective."

continued on page

It takes guts to run your video through an kegami broadcast monitor.



With twice as ny image-mak- g dots on its pe, an Ikegami color-tv monitor can show up in nervingly high resolution a dozen or more ngs that could go wrong in your picture. Not st purple cows, but the smallest anomaly in earity, the slightest picture distortion, the most rginal overload.

This one is our Model TM14-2RH. A comb filter ps maintain resolution to more than 600 lines. gives you a choice of over- or under-scanned ture display.

Damage to its picture tube is prevented by wer-protective circuits. Up front are all adjust- nts for its 14-inch CRT and inside are modular boards for simple servicing and maintenance. keyed back-porch clamp system keeps the black el constant for maximum picture stability.

There are both pre-set and adjustable controls. deo response is from +1 to –2 dB from 60 Hz 8 MHz.

It has extemely rigid, sturdy construction and available in a free-standing cabinet or for ndard 19-inch rack mounting. Its built-in de- ussing circuit and magnetic shield to fend off ternal magnetic effects make it possible to move e Ikegami monitor without affecting its pic- re.

Also available from Ikegami are our Series ght monitors for broadcast studios. There are ur models, 25, 20, 16, and 14 inches. All use integrated circuits for high stability, long service life, and very modest appetite for power. Their picture tubes have black matrices for maximum contrast and best color fidelity. A keyed back-porch clamping circuit keeps pictures stable with proper black level. Video response is +1 to –2 dB from 60 Hz to 5 MHz.

You can get an optional remote control for brightness, contrast, and chrome.

We really shouldn't have to give you all the specs. The name Ikegami alone is enough to tell you how good they are. But if you do insist on more, ask Ikegami. Ikegami, the leading manufacturer of ENG cameras, manufacturer of the best in studio cameras, and now the best in monitors, too.

Ikegami

Ikegami Electronics (USA), Inc., 29-19 39th Ave., Long Island City, N.Y. 11101. (212) 932-2577

For More Details Circle (42) on Reply Card

KCST

continued from page 44

Electronic field productions

For major planned news even KCST-TV can use both ENG va tying them together for two-came productions with direct on-a switching.

This was used recently when federal judge threw out the S Diego Public Schools' integrati plan, telling the school board th would have to redesign the plan next year.

The ruling came at 4 p.m., ju one hour before the other statio went on the air with their eveni news. Because KCST-TV broadcas its news at 6:30, however, t station had enough time to send o the ENG units for the story. By a time, a complete report had be put together (using mini-cam equi ment) which combined two nev stories: the viewpoint of the scho board to the court's decision; a the views of minority leaders.

Then, at 7 p.m., KCST preempte regular programming to broadcast special report on the decision a its implications. Using both EN units, connected to Newscente viewers had the opportunity to c the station and discuss the iss with the school board, minori leaders, and the family who h brought the original suit against t schools.

KCST will be doing more in EF which Peterson sees as a natur extension of ENG applications. fact, Peterson rejects the notion th ENG should be used just for "live reports during every newscast.

"If a news story warrants a li broadcast, we will do it," he sai "We don't want to do what so stations are doing, though; f example, going to the opening of a opera and standing in the lob with a 'live eye' report."

Comments

As KCST moves toward total EN more emphasis will be placed using tape rather than film in t production of in-depths news fe tures. Restricting ENG only to "live reports is failing to utilize a important innovation in broadca journalism.

Although the term EFP has be confined to non-broadcast mediu until now, when stations, like KCS learn to take advantage of the ENG equipment, they, too, will beg applying EFP techniques—a natur extension of present ENG use.

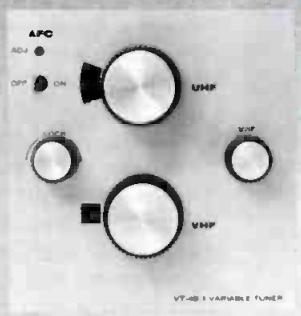
Used in 30 countries . . .
DYNAIR's RX-4B
All Channel Demodulator

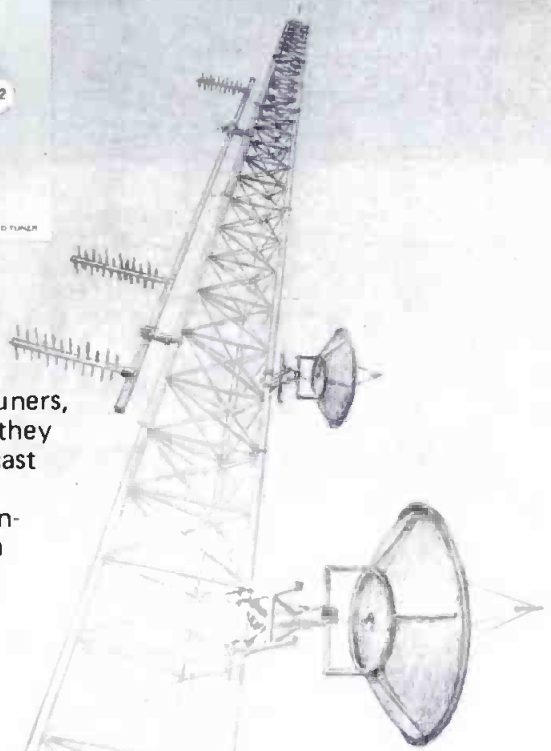
VT-4BU Plug-in
UHF Tuner

Model RX-4B Solid-State Off-Air Professional TV Demodulator
with Plug-in Tuner Front-Ends

FT-4B Plug-in
Fixed VHF Tuner

VT-4B-1 Plug-in
Variable VHF/UHF Tuner





NAIR's Models RX-4B and RX-4BE, equipped with plug-in tuners, now in use in over 30 countries around the world. In fact, they compatible in 63 of the 136 countries with on-air broadcast vision.

Designed for professional use, the demodulators have demonted excellent reliability and outstanding performance with r seven years of field use throughout the world.

The RX-4B is compatible with NTSC and PAL M color ndards (system M and N) and the RX-4BE provides operan on PAL B color standards (system B). Both operate on 5/230V, 50/60 Hz and require only 40 watts.

For monitoring video modulation levels and for use in R closed-loop operation, the optional solid-state video pper may be added.

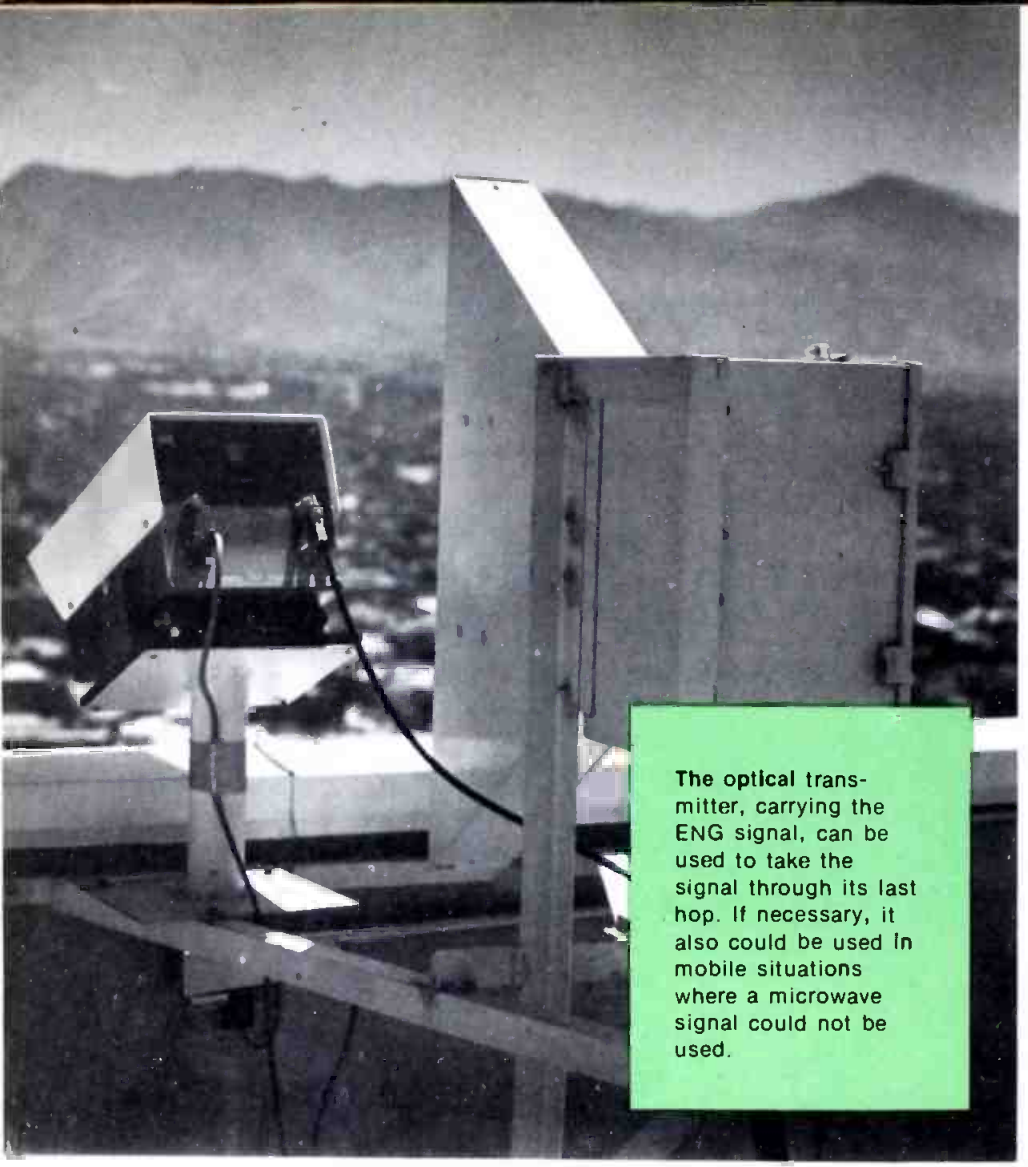
For off-air broadcast monitoring, CATV, or relay vice, select a DYNAIR demodulator.

Write or call us for complete details including a e copy of our VIR applications bulletin.

YNAIR ELECTRONICS, INC.
5 MARKET ST., SAN DIEGO, CA. 92114
ONE: (714) 263-7711; TWX: (910) 335-2040

DYNAIR

More Details Circle (44) on Reply Card



The optical transmitter, carrying the ENG signal, can be used to take the signal through its last hop. If necessary, it also could be used in mobile situations where a microwave signal could not be used.

ENG takes a ride on infrared optics

By Ron Merrell, Editorial Director

TV signals can ride quite nicely on an optical beam. They were already getting a lift from fiber optics. Now they can take a ride on an infrared optical beam, and 2,000 feet later be received almost without a hitch.

This latest use of an infrared optical carrier is not as farfetched—or far out—as it may sound. Ask the engineers at KSL-TV in Salt Lake City or KSD-TV in St. Louis, and they'll give you different versions of how and when this technology can be used. But on this much they agree, the systems do work, and the technology shows great promise for ENG broadcasting.

What makes the infrared optical carrier so interesting is that no license is required. Of course, it helps that present systems also are less expensive than conventional microwave units. But then there is no spectrum crowding in the infrared range. What's more, unlike cable, no conduits, permits, right of ways, or cabling labor is involved. Without regulatory restriction of bandwidth, the system is flat to beyond 10 MHz without ringing overshoot. And, two audio chann can be used.

Infrared in Salt Lake City

Some of the first infrared opti broadcast video tests were run KSL-TV. Chief Studio Engineer Ho ard Smith is quick to point out th "We are pioneers, but sometim the pioneers take the pie in th ears!" What Howard means is t when you are running ahead of t field, especially in a new tec nology, you have nothing to f back on except the belief that y can make the system work. Duri the initial trial runs, cooperati engineers can be severely qu tioned for the time, effort, a money spent on something that m not work at all. And even when t end result is a working system, seldom occurs to outsiders th there were any sacrifices by t station engineers.

The system used at KSL was bu by American Laser Systems, California operation based in San Barbara. Two models are availab The 761 is the ENG broadca version. The 747 is an industri quality system that sells for co siderably less than the broadca version. Based on field experien the 761 has been modified eliminate early test problems.

Getting off the ground

By mid-1976, Howard Smith h bought much of the equipment f the KSL ENG hookup. They had t van, had installed the Terraco microwave, and mounted the om directional Nurad antennas at one of the tallest buildings in tow the 26-story Beneficial Life Tow This building is across the str and down a block from the KSL tw story studio. The link was compl except for the relatively short 7 foot hop from the microwave ceiver to the studio.

Costs for a coax cable in t downtown area proved prohibiti at the time, and licenses and f quency allocations for a permane short-hop microwave were not for coming. An infrared optical tra mission system using a low-power optical beam filled the gap for t short-hop application.

A pie from the West

From the beginning, it was ob ous the system would answer short-hop problem at KSL. T doesn't mean it all came off with a hitch. That the system did s vive—with improvements to

continued on page

CANON ANNOUNCES THE ULTIMATE STUDIO LENS

	PV18x12B2 (for 1"/25mm Plumbicon*)	P18x16B2 (for 1¼"/30mm Plumbicon)
Focal length	12-216mm	16-288mm
with 1.5x range extender	18-324mm	24-432mm
with 2x range extender	24-432mm	32-576mm
Maximum relative aperture	1:1.6 (f=12-172mm) 1:2.0 (f=216mm)	1:2.1 (f=16-230mm) 1:2.7 (f=288mm)
Zoom ratio	18x	18x
Image format covered	12.8 x 9.6mm; 16.0mm dia.	17.1 x 12.8mm, 21.4mm dia.
Minimum object distance from front vertex	0.7m (27.6")	0.7m (27.6")
Object dimension at minimum object distance: Wide	103.2 x 77.4cm; 129.0cm diameter	
Tele:	5.3 x 4.0cm; 6.7cm diameter	
Back focal distance	62.65mm (in air)	78.08mm (in air)
Glass compensation	69.2mm (BK7)	70.2mm (BK7)
Wavelength range for color correction	400-700nm	400-700nm
Dimensions	466.5mm length x 284mm width x 260.5mm height	
Focus and Zoom control	Manual, with plug-in interchangeable servos	
Range extender control	Plug-in servo / manual	

*TM N.V. Philips of Holland

The new Canon 18x series for major broadcast cameras. With the best relative aperture, superior wide angle and shorter M.O.D. Choice of manual or servo focus and zoom. Built-in servo/manual operated 1.5x and 2x extenders. And interchangeable, plug-in servo modules, for easier service. All at a competitive price.

Judge for yourself. Compare the specifications below. Factor in Canon's nationwide service and comprehensive loaner program. And see a demonstration.

For more information, please write or call:

Canon®

Canon U.S.A. Inc. Head Office. 10 Nevada Drive. Lake Success. N.Y. 11040 (516) 488-6700 • 140 Industrial Drive. Elmhurst. Ill. 60126 (312) 833-3070 • 123 Paularino Avenue East. Costa Mesa. Ca. 92626 (714) 979-6000
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

For More Details Circle (28) on Reply Card

continued from page 48

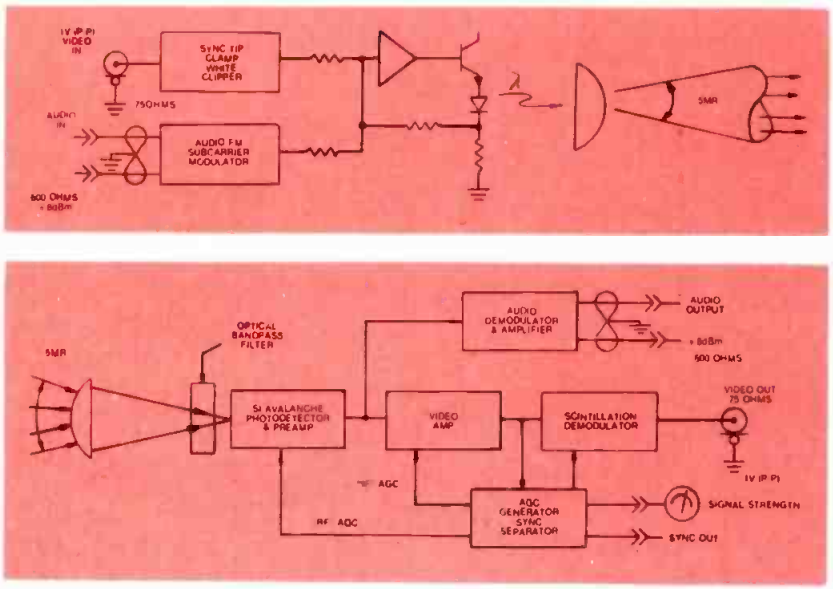
product—is a testimonial to KSL engineers and the system designer, Duncan Campbell.

But so you won't get the idea that these engineers (or this editor) bought a pie in the sky, let's take a look at what the engineers at KSL ran into on the way to becoming infrared ENG pioneers.

The KSL installation happens to be on a East-West radial, with t receiver facing West, with inclination of 35°, due to t elevation difference between t transmitter and receiver. The K group noticed that during a sho period of each day, for a week or in the summer, the signal becan noisy, and the signal never ful recovered.

A staff member, who is astronomy hobbiest, computed t sun's position, and found that, eight days of each year, the s passed right through the receiver field of view. Further investigati found that the lens in the receiv acted like a burning glass, and t sun's rays etched a path across t receiver's optical filter, degradi the system's performance.

It was the coincidence of bei right on an East-West radial, combination with a high inclinati angle, which contributed to th condition. Changes have since be made in the system to reduce prevent such possibilities in t future. Although it was not possib at KSL, mounting the optical tran mitter a few feet down on the si of the building would have block the sun and eliminated the proble



A block diagram of the complete optical TV transmission system: Transmitter (top) and receiver (bottom).

Inside the black box

The transmission set referred to in this article works on the principle of an infrared optical light beam used as a carrier instead of the familiar RF carrier. Any signal bandwidth can be impressed on the carrier. The system is flat beyond 10 MHz, and this contributes to the transient response, because no bandwidth limiting filters are needed.

The video signal amplitude modulates the beam. On the audio side, the two 15 kHz channels FM modulate 10 MHz subcarriers which also ride on the beam.

The modulated light from the infrared emitter is captured by the transmitter lens (an optical antenna). From there, the light is formed into a narrow beam which spreads to about 10 feet in diameter at 2,000 feet.

At the receiving end, a portion of the beam energy is captured by the receiving lens, where it passes through an optical bandpass filter and is focused on a silicon avalanche photodetector. The optical filter looks like a piece of flat black glass. It's really a tuned optical resonator which passes only the frequency of the infrared transmitter. This filter helps eliminate unwanted light sources, such as the sun, headlights, street lights, etc.

The silicon avalanche photodetector is an extremely sensitive device that both amplifies the signal and recovers the baseband signal (video plus audio subcarrier) from the optical carrier.

The video signal is amplified, hit with AGC and clamped to take out rapid fluctuations due to atmospherics. The audio subcarriers are separated, demodulated, and the resultant signal amplified to an +8dBm, 600 ohm balanced level.

The KSD-TV version

When the same system w installed at KSD-TV in St. Louis, t day came (by coincidence) when t sun hit the receiver lens at th same critical angle...with about t same results. In this case, t receiver was moved down the si of the building, and that d eliminate the sun interference.

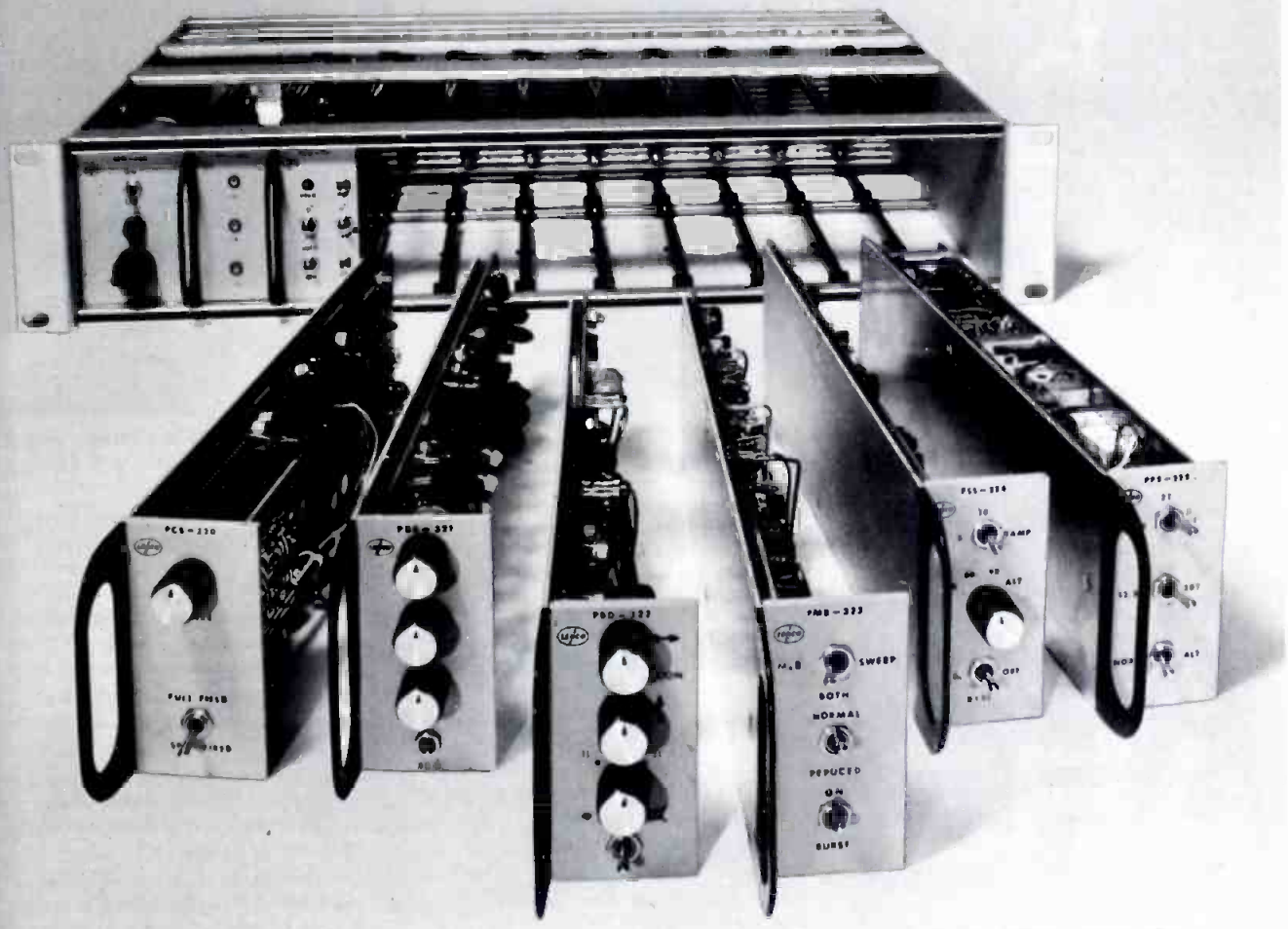
Monte Walpole, KSD's enginee ing manager, is extremely interest in following the development optical transmission systems. B for the present, KSD's system used as a backup in case t conventional microwave link go down.

KSD-TV is one of those statio working hard to bring ENG into efficient and effective meld with t local news show. The fact that th use a backup final link syste indicates how serious they a about getting the ENG report on t air. And the fact that the backup an infrared optical transmissi system tells us a lot about the interest in new technologies bum ing into ENG.

This isn't one of those ne products claiming to solve all yo problems. It was designed as

continued on page

Introducing the you-name-it, you-got-it video test set.



Here, finally, is a totally integrated modular video test set designed specifically for professional use. Lenco's 300 System lets *you* specify video test signals to meet *your* system requirements, not the manufacturer's.

Use the Lenco PSG-310 Digital Color Sync Generator, or one of your own generators, with any one, a combination, or all of the test modules. Mix 'em or match 'em any way you want. There are 29 test signals available to answer *all* of your system test specifications.

And with the Lenco 300 System, you get a lot more for a lot less. For instance, all of our advanced test signal modules have composite video delay, making Lenco the *only* manufacturer that can *individually time* the test signals to your system.

You won't have to wait to find out how much better the 300 System test set is, either. We'll deliver it to your studio within two weeks. And we're so sure of your acceptance of Lenco equipment that we offer a *two-year* warranty on all parts and labor—and that includes freight to and from our factory!

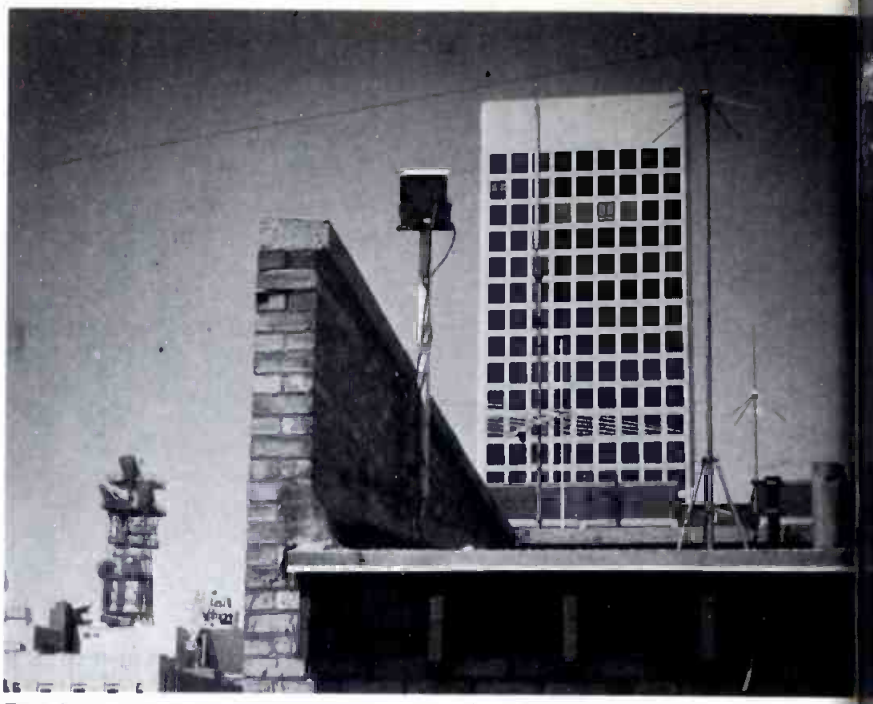
Call or write for a demonstration today. You'll find Lenco to be your first — and only — video test set alternative.

LENCO

LENCO, INC., ELECTRONICS DIVISION

300 N. Maryland St., Jackson, MO. 63755. (314) 243-3147 / 13670 Littlecrest Dr., Dallas, TX. 75234 (214) 241-0976 / P.O. Box 301, Atchison, KS. 66002. (913) 367-1146

For More Details Circle (29) on Reply Card



This is the receiver end of the infrared optical link. It's a lot more critical th the transmitter end, in this arrangement, because the unit must lock up at t transmitter.

ENG

continued from page 50

additional ENG tool, not as a system to replace microwave. Fog is still a problem. While the effective range is 2,000 feet, heavy fog can degrade the signal below usable levels. Rain and snow normally don't cause major problems, but extreme weather conditions can have some bad effects. It should be brought out, however, that KSD has never lost their signal on the optical system due to weather.

The snow that caused snow

The system, built for all-weather operation, contains window and lens defoggers to melt ice and prevent condensation. But Noel Clark, of KSL, noticed that during a heavy wet-snow blizzard the signal gradually degraded and finally dropped out. When he went to investigate, Clark found a snowdrift in front of the receiver. The wet snow had been packed into the upturned receiver window, completely blocking the optical signal. After clearing the drift away, the signal returned to normal, even though the visibility over the 780-foot path was almost non-existent, due to the heavy snowfall.

It's in the field use that has brought on design changes, making the infrared technology even more viable for ENG. In fact, KSL is in the process of converting their ENG system, using two optical transmitters for out-the-window down links to optical receivers on the vans at the news site. Meanwhil they have converted their fin down link at the studio to conve tional cabling, with an optical fib link on the side.

Newer versions of this optic transmission system include i provements based upon the e periences at KSL and KSD. Wh may be the biggest news is the K intent to use infrared systems at t ENG news site. Without bells a flashing lights, an alternative an or backup system has been intr duced to ENG. After paying t dues, infrared is ready.

Acknowledgements

The editor wishes to thank Ho ard Smith of KSL, and Mon Walpole of KSD for their commen and ideas, based upon daily use optical systems. And certainly, so credit should go to Duncan Campb of American Laser who near inundated me with materials on t basics of infrared optical tran mission techniques.

I also would like to acknowled that using infrared to transmit aud and video signals was not a conce developed just months before E went to press. The system describe in this article was installed almo two years ago. There are industri uses of such systems in operati today that make the broadca applications look simple.

Meet the Picture Catcher. By NEC. For Faster Search.

It's the editor's friend. The NEC NTC-5000 is a wide-window time-base corrector with unique, momentary locking circuitry that captures individual color-locked pictures whether the VTR is in pause, rewind or fast-forward modes. So you can zero-in on exactly the frame you want. Fast.

Utilizing PCM circuitry, the NTC-5000 provides universal time-base correction for any VTR including helical, regardless of color processing technique.

Complete color processing is made possible by 3.58 MHz feedback to the VTR, or, optionally, without the feedback through use of a heterodyne adapter.

There are many reasons why this is the most versatile time-base corrector available anywhere. So, before you decide on any TBC, be sure to see NEC's picture catcher.

It's handy to have around. Like a friend.

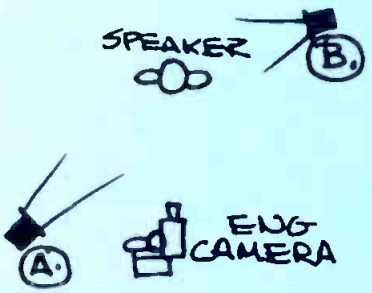
NEC
Nippon Electric Co. Ltd

NEC America, Inc.
Broadcast Equipment Division
130 Martin Lane
Elk Grove Village, Illinois 60007
(312) 640-3792

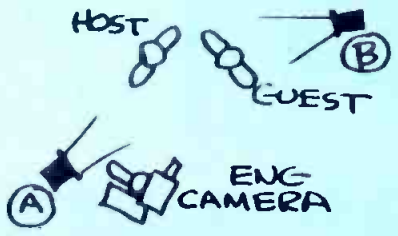
For More Details Circle (49) on Reply Card

Crash lighting for ENG

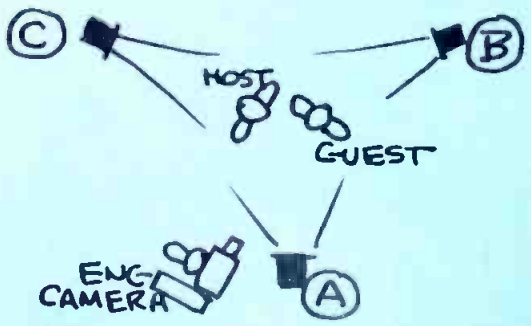
By **E. Carlton Winckler**, Senior Production Consultant and Director, Education Division; and **David M. Clark**, Lighting Director and Graphics Arts Director, Imero Fiorentino Associates.



Single speaker with two lights: (A) speaker and background; (B) speaker only, barndoor off camera.



Host and guest with two lights: (A) guest key, host side background; (B) host profile, guest rim light.



Host and guest with three lights: (A) front fill, background (if low ceiling, may bounce to avoid harshness); (B) host key, guest rim; (C) guest key, host rim.

Today's electronic news gathering (ENG) camera are absolute marvels of automatic operation. They can be made ready to operate with only the most basic human assistance. Their new freedom has placed the ENG camera in direct competition with news film cameras where it is doing very nicely.

Any slight difference between the ability of film or ENG cameras to accept what they are pointed at is negated by the fact that the home television receiver is capable of reproducing less than either camera can record.

If we accept the idea that both recording systems are roughly equal, why is it that the pictures we see are so unequal? Of course, it is because the cameraperson, not the camera, senses the dramatic composition and the detail that enhances our view of it. The ENG cameraperson has a lot of catching up to do to compete with film people, not in terms of hardware anymore, but in the very human selection and rejection of picture elements within the recordable range.

For example, let's consider the worst possible situation for a cameraperson: an assignment to cover the brief remarks of the mayor at City Hall as he leaves a budget meeting. Twenty cameramen are jammed together in a moving, jostling crowd anxiously waiting to record two minutes of his Honor, who is trying desperately to feed the *Six O'Clock News* without saying anything he'll regret later. Precious little can be done about choice of background or composition; mere personal survival is paramount in the cameraperson's mind.

Why, then, were news pictures from actual war zones in Vietnam beautifully composed and sensitive to conditions of natural light? It is because the war film was shot by a person totally familiar with the camera and possessed of long experience in sensing the picture. Editing, if any, was lovingly done by another person with an experienced picture eye.

The tape of the mayor was shot by someone still preoccupied with the mechanics of the electronic camera, and whose eye has not yet mastered the ability to see as this camera sees. Add the intense impact of warfare contrasted to the predictable dullness of the mayor, and we begin to expose the human nature of newsgathering.

continued on page 56

THE SYNCHRONIZER BECOMES MORE POWERFUL. AND LESS POWERFUL.

AND MICRO CONSULTANTS IS THERE WITH THE QUANTEL DFS 3100 AND DFS 1500.

The new DFS 3100 is the successor to the DFS 3000, the world's most highly acclaimed digital framestore synchronizer. But the microprocessor-controlled DFS 3100 is more powerful. Its production control option puts a wide range of effects at the producer's fingertips.

Effects like freeze with automatic updating. Video compression. Joystick control of compressed and full frame pictures. Automatic positioning to predetermined locations. Automatic tracking of chroma key for compressed images.

Automatic fast or slow wipes. Smooth cuts from compressed to full frame video. And more.

But if you need less, the new DFS 1500 gives you basic fieldstore synchronization and truly outstanding time base correction. It's ideal for broadcasters who don't need all the power of the 3100, as well as those who have a need to use it in addition to a 3100.

Both synchronizers are portable and rugged. Both dissipate only 250VA. Both are perfect for studio or OB van.

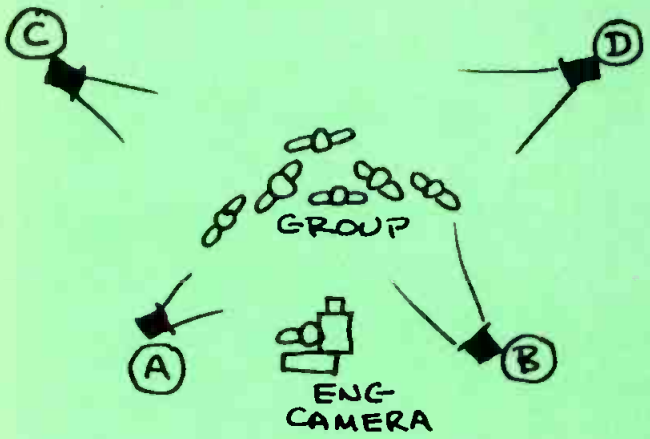
So whether you need more synchronizer—or less synchronizer—get in touch with Micro Consultants, Inc., P.O. Box 10057, Palo Alto, California 94303, (415) 321-0832.

The digital video people

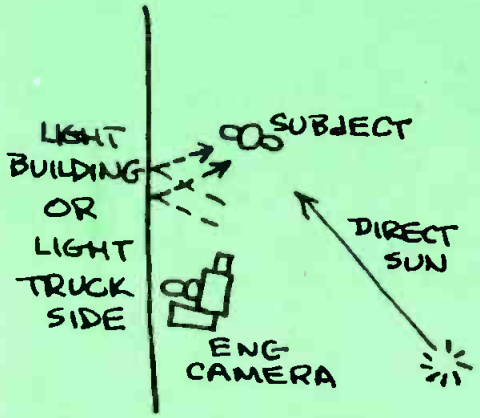
For Literature Circle (46) On Reply Card
For Demonstration Circle (106) On Reply Card

Crash lighting for ENG

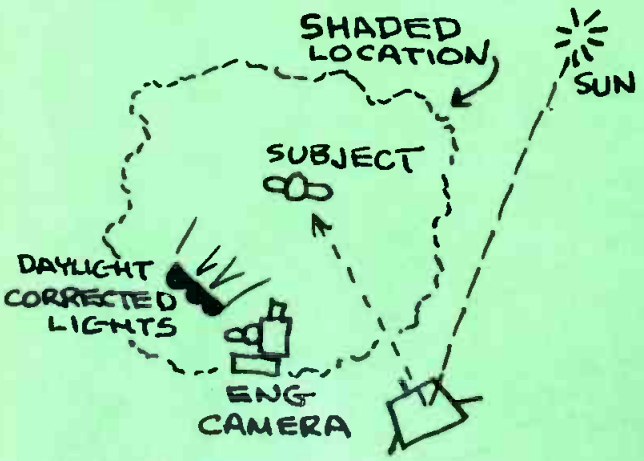
continued from page 54



Group with four lights: (A) and (B) cross fronts and background may tilt up to semi or full bounce; (C) and (D) cross backs—place as far away as room allows—flood scrim or tilt down to make about half as bright as (A) and (B).



Use of natural reflector to fill shadow side of subject.



Subject in shaded location to avoid harshness of direct sun.

Cameras and editing machines do not choo pictures, people do. In all cases, whether wartime a routine political gathering, there is the opportun to position some light, or place the camera in relati to existing light, so that the picture quality enhanced.

And no excuses, either

Yes, we know about the tough news editor w dispatches the camera crew with instructions to g the story, and does not want to be bothered about t picture quality. He is the same fellow who driv studio production people crazy and then calls in c company experts to improve the lighting on t anchorman when a slight shadow is detected on h upper lip!

Of course, as lighting and production consultan we are always ready to oblige. Getting rid extraneous shadows is a minor specialty of the hous A critical look at remote news segments, shot in citi where some environmental control should have be practical, indicates a consistently similar pattern poor judgment of backgrounds and a tendency place portable lights and the camera in less than ide positions.

Is this an inevitable result of the pressure and ru of getting coverage of the news event? In so instances, this may, indeed, be the case, but in t very large majority of cases, newspeople spend the time waiting and waiting for the event to take plac and therefore excuses have little validity. Even in t coverage of a spontaneous event that is beyond t control of a crew, and almost always in prearranged event or interview, camera placeme allows some choice of background. Avoiding day- windows, murals or neon signs as part of t background is rarely an impossible task. Shooti against open sky (outdoors or through windows) has tendency to make your subject somewhat invisible the screen.

How to avoid the problems

If the news director/cameraperson will only ke these basic points in mind, a whole array of pictu problems can be avoided before they get onto tape film:

- The television screen is two dimensional, so lig from more than one angle is needed to provide illusion of the separation between picture elements;
- The eye of the viewer is always attracted to t brightest area in a picture (compositional elements lighting); and
- An electronic camera on automatic iris will expo for the brightest large area in the picture. Th exposure will affect the entire picture, not just t bright area. The more intense the bright area, the le detail will be visible in shadow areas.

Let's review these three points to disprove a p theory that lighting is the cause of all pictu problems. Actually, lighting is only at fault som times—but never underestimate its importance.

A remote news crew usually goes out with minim lighting equipment—two, maybe three lights. Becau current ENG cameras are extremely sensitive, it hoped that even for interior shots the existing lig will be enough. Sometimes, just to be sure, the cre unpacks a couple of lights and plants one on each si of the camera to make faces nice and bright—*theref*

continued on page

Crash lighting for ENG

continued from page 56

guaranteeing a dull, flat picture, accented by the washed out and featureless look of the subjects who end up nearest the lights.

Care should be exercised that the natural room light is allowed to supply the major part of the exposure, with just enough light added at a low angle to bring out facial detail. Since the only monitor available to the mobile ENG crew is the tiny camera viewfinder, *the use of a light meter is vital.* Faces are the important part of the picture, but where the people are located adds the reason for remote shooting in the first place.

At the scene

Instead of plunking your two lights next to the camera, try the more interesting approach shown in the sketches. Include bounce light, mis-focus to decrease light modeling from sides, not top (as in studio). Be sure, however, that one of the light sources isn't too close to a subject; you might even move the subject a bit in order to avoid overexposing that subject. Reducing the lens opening to compensate for the over-lit item copes with that problem just fine, but all the other items in the picture now are very dark. Don't add more light to these suddenly dark areas; instead, reduce the light on the bright area—it's both easier and more effective.

Now, in case the other one of the three basic points wasn't entirely self explanatory, let's just emphasize that in an interview or group conclave the faces are the important part of the communication; and, they should be a little brighter than the background, b not so bright that we can't see the location.

More fun in the sun

For daylight exteriors the use of auxiliary light just as helpful in balancing the highlight and shado areas. But, outdoors we have a different set conditions. The footcandles involved are tremendous variable. From bright sun at the beach to heav overcast between two buildings, and everythin in-between is a constant challenge to our ingenuity.

We must use the sun where it is and where it wi move to while we are shooting. If direct sun hits an part of a face in a closeup, we will need more lig than is regularly carried on remotes in order to brin out detail in shadow areas. Look for large reflector to help you. The large expanse of sand and the haz in the air near the water result in the lovely luminou picture everyone gets at the beach.

In a blacktop parking lot, things become muc harsher. Look for a camera position near a whit building to use as a reflector, or a big white truc Don't use sunlit buildings or open sky as the bac ground for a closeup. Foliage or shaded areas wi allow the face to retain dominance.

If you have lights or commercial reflector panels position the subject in a shaded area. The open sky o hazy sun will provide a gentle rim light, and you reflectors or lights can fill the faces. Keep lightin angles very simple. Always stand in for the subjec before shooting: your meter may tell you all is wel when actually no one can stand on the mark withou severe squinting or even panic.

continued on page 6

Up to now you had to choose between the turntable you wanted and the turntable you could afford.

Introducing the MKII Series. Three new professional turntables: The SL-1300MKII, automatic, the SL-1400MKII semi-automatic and the SL-1500MKII manual. All with a totally quartz-controlled direct-drive system with one big advantage: a moderate price.

So to unparalleled speed accuracy, powerful torque and fast start-up action, Technics MKII Series adds quartz accuracy to whatever pitch variation you desire. In exact 0.1% increments. At the touch of a button. And instantaneously displayed by LED.

What's more, all this technology has been compressed into four high-density IC's. So the MKII Series' styling is low, lean and clean.

And our low-mass S-shaped universal tonearm has been made so accurate, friction is an incredibly low 7 mg. (vertical and lateral). The MKII Series also boasts a double-isolated suspension system and anti-resonant base material to minimize feedback.

Compare specifications. Compare prices. And you'll realize there's no comparison for Technics MKII Series.

MOTOR: Brushless DC motor, quartz-controlled phase-locked servo circuit. SPEED: 33⅓ and 45 rpm. STARTING TORQUE: 1.5 kg. per cm. BUILD-UP TIME: 0.7 seconds (= 90° rotation) to 33⅓ rpm. SPEED DRIFT: Within ±0.002%. WOW & FLUTTER: 0.025% WRMS. RUMBLE: −73dB (DIN B). PITCH VARIATION: ±9.9%. SUGGESTED RETAIL PRICE*: $399.95 (1300), $369.95 (1400) and $349.95 (1500).

The MKII Series. A rare combination of audio technology. A new standard of audio excellence.

*Technics recommended price, but actual retail price will be set by dealers.

Technics *Professional Series*
by Panasonic

For More Details Circle (33) on Reply Card

Crash lighting for ENG

continued from page 58

As a test of all this, take a 1000-watt quartz lan and cover it with a dichroic filter or daylight blu mylar to approximate the color of daylight. Next, ho your meter near enough to read 1000 footcandle Now put your face where your meter was and loo just past the light and see if you can remember you name!

Out in the dark

The question, "What about night time?" arises, course. Indoors it makes little difference, but out doors we have lost the sun/sky combination as o main source and we have a whole new project. As starter we can follow the techniques proposed figures we've shown, but using enough wattage, ar setting it very carefully, to provide even distribution

Another consideration is background. A total blac background does no special harm, except that it do nothing to establish where you are—so why go? Th black background also tends to be dull ar encourages video "noise" on less than ideally adjuste receivers. Much is gained by selecting a backgrour with some interesting, but not distracting, hig lights—or by providing this video "information" with spotlight across foliage or architectural detail.

Just remember that you are working with tr mendous size, and you must choose to accent doorway or a shrub, unless you are carrying sever Brute arcs and generators. Position your people clo enough to the background to allow your accent lig adequate coverage.

ENG cameras in the studio

ENG cameras turn up great pictures, are ver flexible, and their small size makes them easier to u than the older, more bulky models that have been use for studio work. As you might expect, the attributes have caused them to be used more ar more widely in studios. What are their problem there? Aside from the possibility that the camer person's new freedom of movement and shootin locations can cause him to stand right in the k light where his shadow will fall upon the action there aren't any problems. Remember, it's still camera, but an advance to be welcomed because the great flexibility it provides.

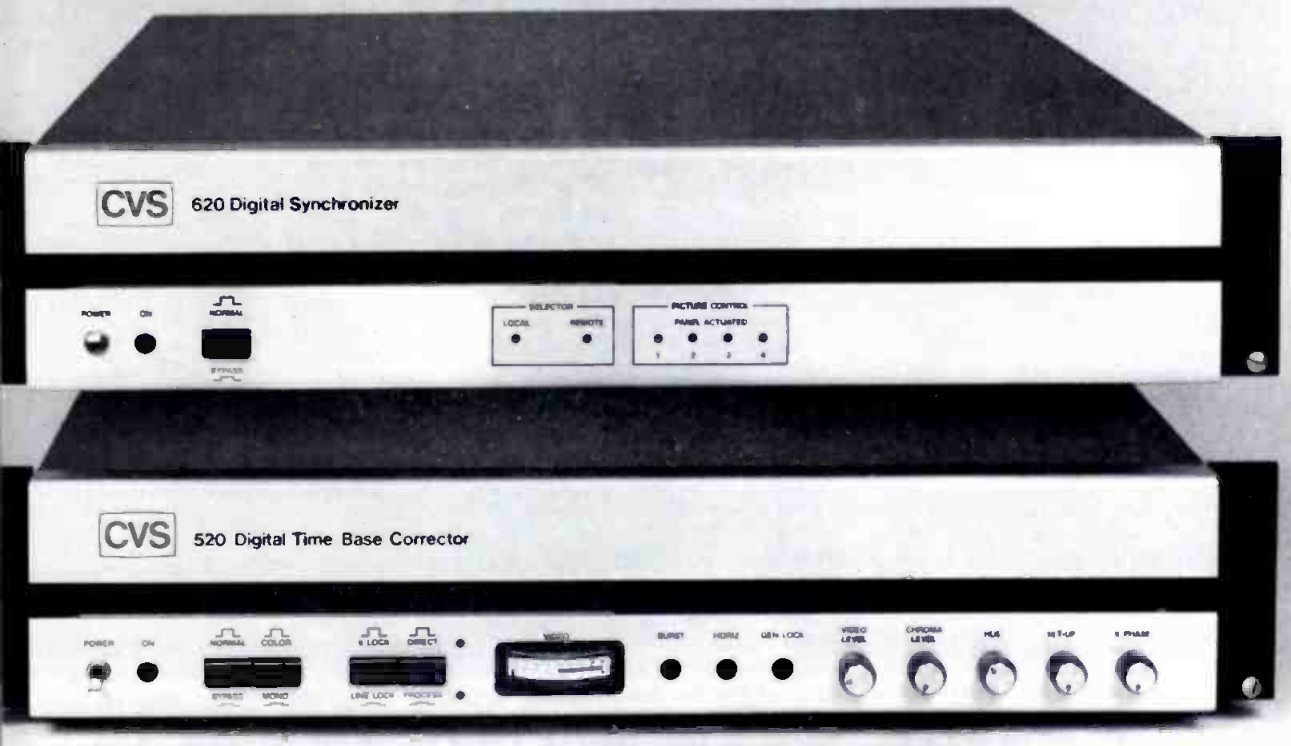
However, a word of caution to directors is neede The hand-held camera will allow for some shots y just can't get with the studio pedestal camera. Try plan the use of your hand-held only for these shot rather than ask your hand-held man to carry th weight through a whole show and "shop for shots."

Most of the time he will come up with the san shots the other cameras have, only wobbly! Th assures that he will be too tired to do the best wi that one low-angle tilt shot, when it comes up. W come the ENG camera to the studio as the special t it is, not as something to be used everywhere becau it's new.

Parting shots

Do we have any other words for the ENG came crew? Well, we must admit, that as lighti professionals, we naturally regard all participan who appear in programs solely as objects on whi light should fall effectively—but perhaps it's wort while for remote newsmen to devote a few si thoughts to the storyline aspect, too.

There's an affordable frame synchronizer in your future,



if you buy the CVS 520 Digital TBC today!

low, the TBC that corrects all your VTRs will soon nronize all your sources. How? With the CVS 620, a act module that operates from the digital interface CVS 520 and comes with full bandwidth color frame ld "freeze."

Vith the CVS 620, your CVS 520 will become a true, processor-controlled "infinite window" TBC. You'll le to easily handle signals from network feeds, satel- and ENG microwave. It won't matter whether they're e or unstable, heterodyne or direct color. You'll still ully color framed, synchronous outputs. A picture oner will add even more versatility.

uture synchronization, however, is just one of the ns why a large number of users already have a CVS t does just about any TBC job you can think of. For TR—segmented or non-segmented.

With the CVS 520, you can colorize old quads, bring quad quality to ENG, correct gyro errors without breakup or hue shift, handle noisy tapes containing multiple wrong field edits, and much more.

Of course, the CVS 520 has all the built-ins. Like a digital dropout compensator, a line-by-line velocity corrector, a gen-lockable sync generator and an adjustable proc amp. Plus simple, front panel controls that put you in total command of your video signal.

Of particular importance for ENG, the CVS 520 weighs only 30 pounds, is just 3½" high and uses only 150 watts. (The CVS 620 will be packaged the same way!)

In short, the CVS 520 is truly the TBC of the future. But you can get it from your Authorized CVS Distributor today! For details and a demonstration, call or write.

CVS Consolidated Video Systems, inc.

1255 E. Arques Avenue, Sunnyvale, California 94086 (408) 737-2100 Telex: 35-2028

For Literature Only Circle (47) On Reader Service Card
For Demonstration Only Circle (48) On Reader Service Card

Stereo-SCA compatibility: Is it really for the birds?

By James L. Tonne

The subject of "whistles" in the output of stereo receivers when simultaneously receiving stereo and SCA is not exactly new. The problem is not peculiar to any one transmitter manufacturer; no method of modulation is secure; and no AFC scheme is sacred.

Most manufacturers are aware of the general problem, but are reluctant to discuss it. And most broadcasters are sure that since they can hear a whistle in their own receivers, and even their stereo monitors, they are transmitting it.

You can be transmitting a magnificent signal, clean and pure, indeed ideal, and you will probably be blessed with a whistle (also known as a birdie).

If, using a tuneable voltmeter, you examine the wideband output (sometimes called the composite or baseband output) of the modulation monitor, you will see the total modulation on the signal you are transmitting. Assuming that the monitor is working properly, the only inaccuracies introduced will be caused by the transmitting antenna and feedline. Their possible effects will be ignored in this discussion.

If you modulate your multiplex transmitter with a 15 kHz tone in one channel only, with no SCA signal, the spectrum observed on the wideband output of the moni should look similar to Figure 1.

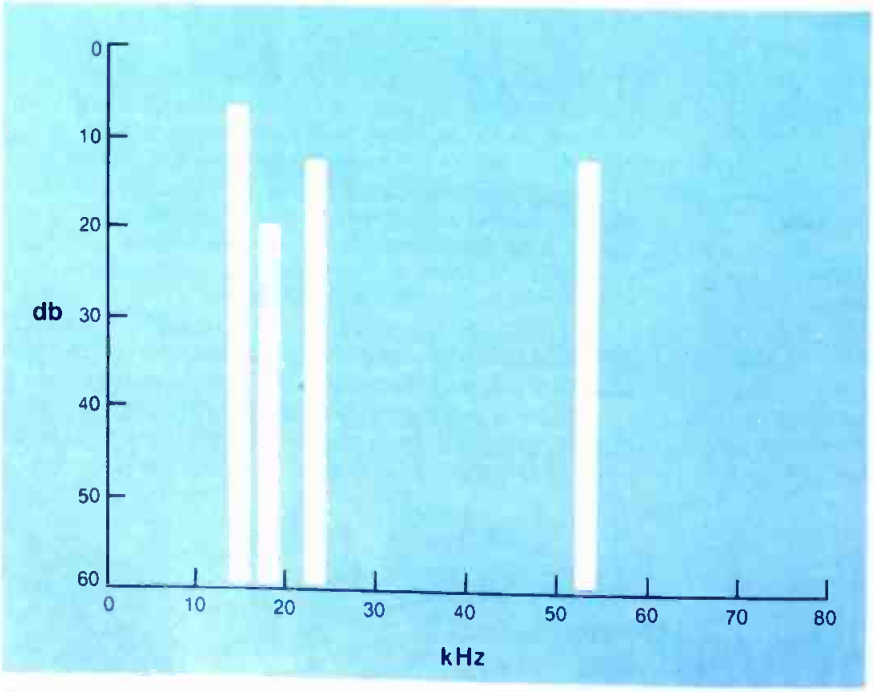


Figure 1 Typical spectrum of baseband signal of stereo station. 100% modulation, one channel only, at a modulating rate of 15 kHz.

The signal at 15 kHz is the ma channel component. The compone at 23 and 53 kHz are the lower a upper sidebands, respectively, of stereophonic subchannel. Hopefu the 19 kHz component need not explained here.

Now add the SCA subcarrier. small liberty taken will be to lea the subcarrier unmodulated. T transmitted baseband spectrum depicted in Figure 2. Notice, a this is most important, that *birdies at 9 or 10 kHz have be added*. This is the signal you a transmitting, and it is free birdies. At least it should be, and this article we are assuming that is as clean as shown (very achie ble, believe me).

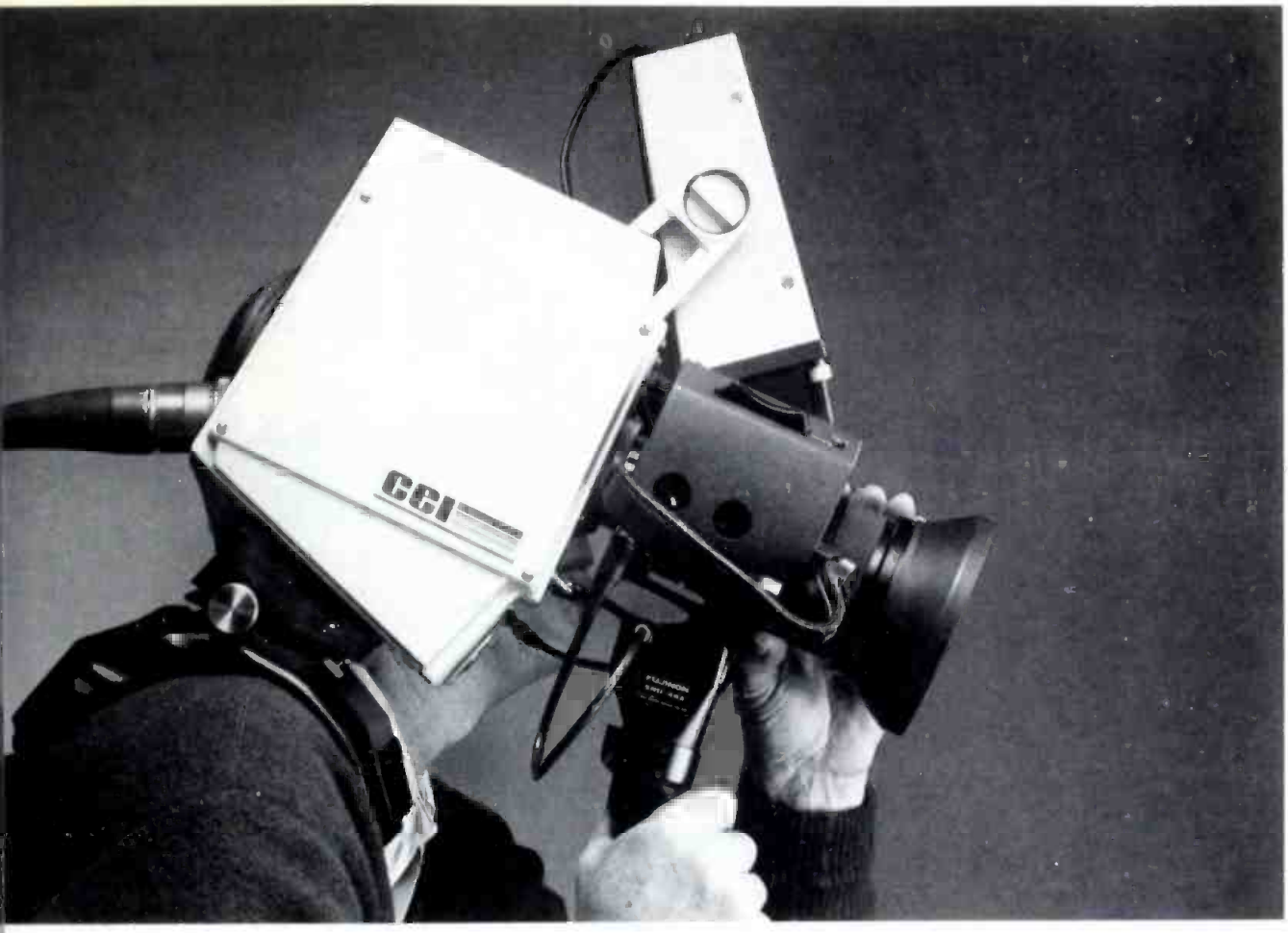
Enter the villain

Move the tuneable voltmeter the output of the switching-ty stereo demodulator. This type demodulator is used in most cu rently available FCC-approved st eo monitors, as well as many ste receivers; it is used primarily b cause of its stability, fidelity, rep ducibility, and simplicity.

Looking at the output of the d modulator proper before the sig has passed through the 15 k lowpass filters, we see the spectru of Figure 3. Logically such spectrum would look complex on oscilloscope: you can confirm t yourself.

Of special interest are the co ponents at 9, 10 and 57 kHz. Y are not transmitting any of the they have been generated in t stereo demodulator. After this sig is passed through a 15 kHz lowpa

continued on page



Can a 39¢ part ever put the CEI-310 out of action?

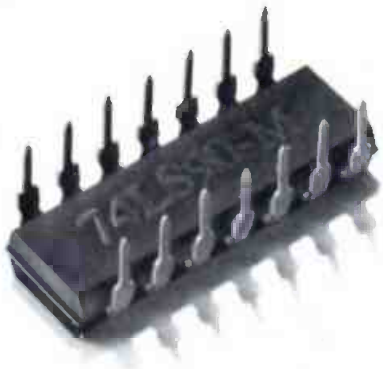
Not for long. If a 39¢ IC does
ow, it's nice to know that the
EI-310 is American-made. Elec-
nic components are American.
d all readily available—from
EI or from commercial sources
over the country.

They don't have to come
m the other side of the Atlantic.
the Pacific.

And our schematics are Ameri-
n, too. Annotated in English.
obably a little more familiar to you
an the ones from Holland or
ance or Japan.

But we're not just selling service-
ility and easy-to-read schematics.

After all, a camera is ultimately judged by the pictures it makes. The CEI-310 gives you uncompromised full broadcast quality video performance, with outstanding signal-to-noise ratio, sensitivity, and resolution. And full production system control features.



Plus total modularity so it can do everything you've ever wanted a camera to do.

So we're not asking you to buy American because we're chauvinists. But because it's your best choice. For serviceability and for picture quality.

And **reliability.** Our customers think the CEI-310 is the most rugged, most reliable production camera on the market. Ask one of them.

Isn't it time you took a new look at CEI? Call your local CEI representative now. Or get in touch with us directly at 880 Maude Avenue, Mountain View, California 94043. (415) 969-1910.

Take a new look.

cei

For Literature Only Circle (49) On Reader Service Card
For Demonstration Only Circle (50) On Reader Service Card

Stereo-SCA

continued from page 62

filter, the 57 kHz component is removed but the 9 and 10 kHz components remain. The 57 kHz signal is generated in the demodulator by the "chopping" or decommutating action on the pilot signal itself by the locally-regenerated 38 kHz carrier. The 10 kHz signal is then a by-product of an intermodulation between that 5 kHz signal (generated in the stereo demodulator) and the 67 kHz SCA signal.

The 9 kHz signal, should it be present, is a result of the 38 kHz demodulating carrier having a second harmonic component. Normally the 38 kHz square-wave demodulating waveform has no even-order harmonics; if, however, a secon

continued on page

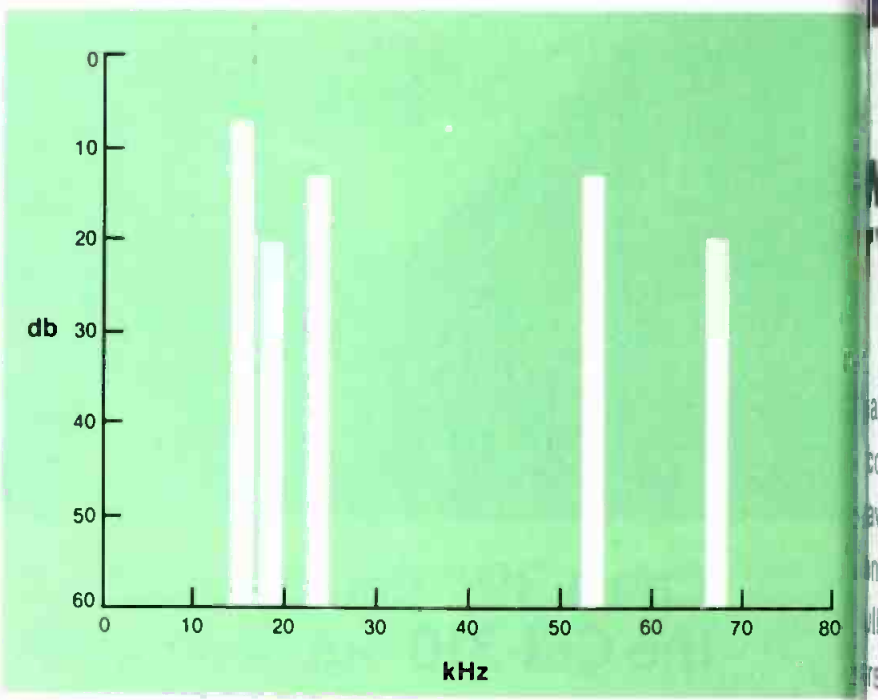


Figure 2 Same as Figure 1, but with added SCA subcarrier at 67 kHz.

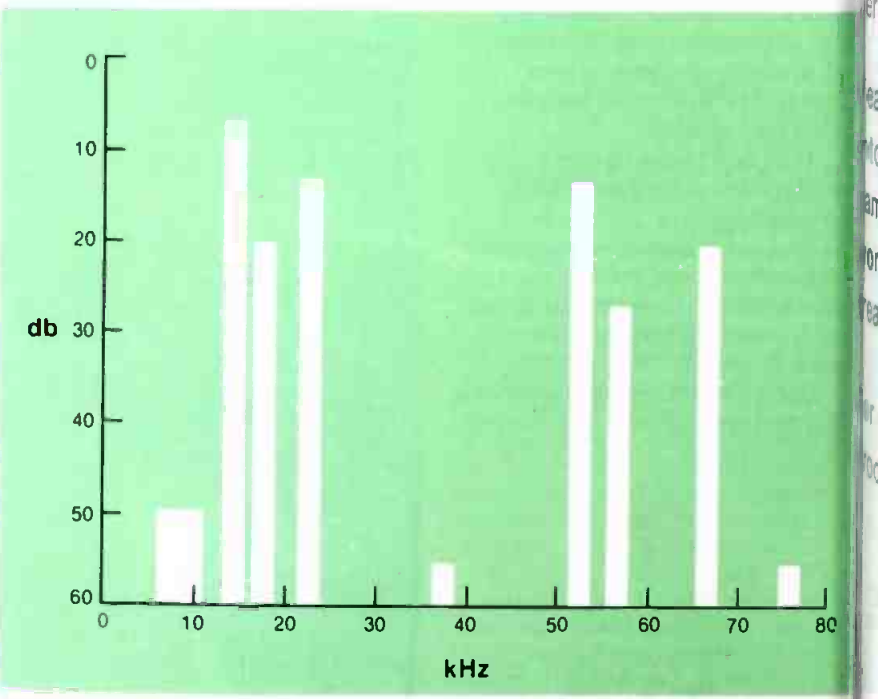
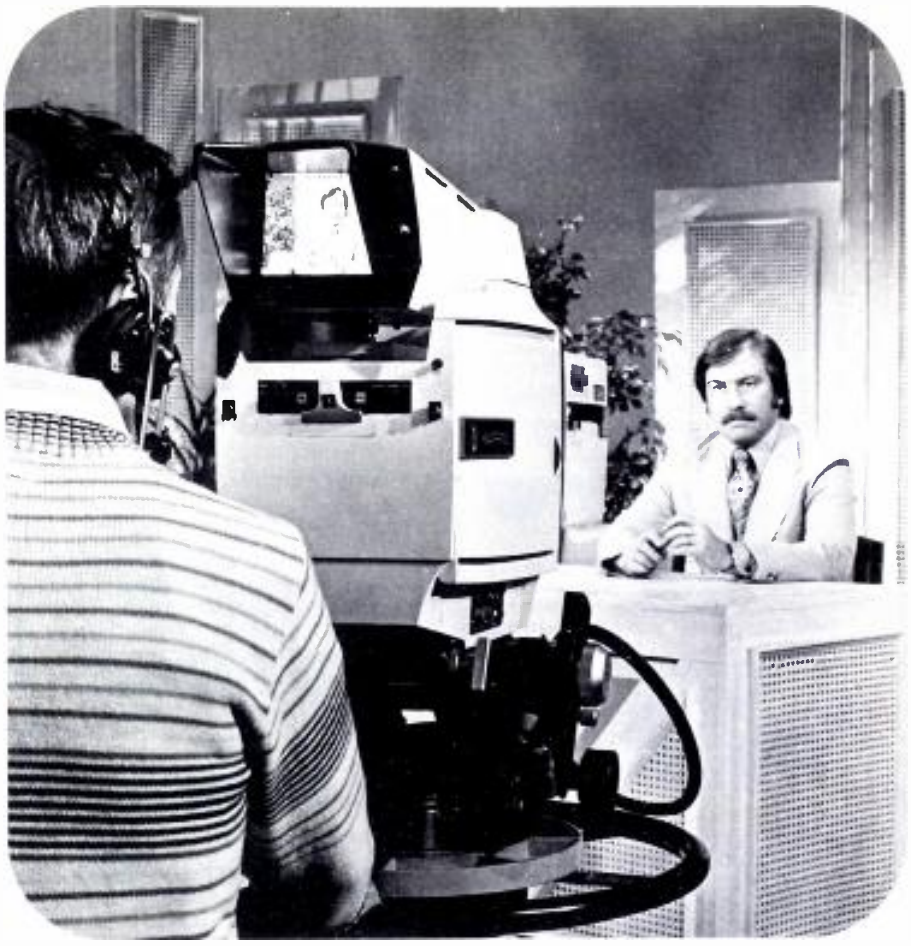


Figure 3 Signal of Figure 2 after passing through a stereo demodulator. Typical 9, 10, 38, 57 and 76 kHz spurious signals are shown.

mprove
our
mage...

ith Harris
V Cameras



arris' engineering
complishments
ve led to such
novations as the first U.S. manufactured
ll Triax capability...first with electronic picture rotation...
st to use field selectable Anti-Comet Tail tubes...
creased reliability...and great economy through optimum
rformance at low light levels and reduced setup time.

ears of broadcast experience and advanced technology have gone
to the design of the Harris line of television cameras. And, Harris
meras are user proven...over 200 in use in stations throughout the
orld where Harris equipment is building better images...
eating better pictures...saving time and money!

r complete information write Harris Corporation, Broadcast
oducts Division, Quincy, Illinois 62301.

HARRIS
COMMUNICATIONS AND
INFORMATION HANDLING

For More Details Circle (36) on Reply Card

Stereo-SCA

continued from page 64

harmonic component exists due to lack of waveform symmetry, th that component (at 76 kHz) c directly demodulate the 67 k signal and produce a birdie at t difference frequency of 9 kHz.

Other stereo demodulators, su as the "envelope" type, may ha these same general problems, p possibly a few of their own; f example, a horrendous amount of kHz feedthrough.

The case of people vs. dB

How far down are these 9 and kHz components? Typically, aft de-emphasis, about 55 to 65 dB. interesting point here is that some cases the human ear can he the birdies, yet they do not show as a degradation of system SN Evidently our ears are quite sens tive to these mid-high frequencie especially where the objectionab material is a single tone. T residual hum and hiss might me sure greater on a voltmeter, but t human ear is more concerned wi the high-frequency whistle.

If the 38 kHz demodulating decommutating activity is prohibite the 57 kHz and 76 kHz componen (generated in the receiver) wi disappear, and along with them t 9 and 10 kHz whistles. Note that receiver without a stereo demodul tor, as for example a small alar clock radio, will not have the birdies.

The amplitude of the 57 k signal generated in the stereo d modulator is several times that of terribly misadjusted pilot tone. T pilot should not have more th 10% total harmonic distortion. Ev if you did transmit the pilot wi that much distortion, and even if were all third harmonic, at 57 kH that distortion would still be sm in comparison with the level of t 57 kHz signal generated in t stereo demodulator.

In a good stereo demodulator, t level of the 76 kHz compone developed in that demodulator w be quite low, competitive with good stereo generator.

Harmonic content of the pilot, itself, cannot cause birdie gener tion. You must intermodulate (mi the 57 kHz component with the SC signal to generate the 10 kHz be note. A 76 kHz component in t demodulating waveform unfort nately is capable of demodulati the 67 kHz signal on its own witho the intermediate spurious-sign generation step. Even if you d

mit a 76 kHz component, it d not pass through the 19 kHz extraction bandpass filter in eceiver.

The solution?

e stereo and SCA signals com- le? The answer is, Yes, trans- on-wise. But the receiver manu- rers are still playing the game e blind following the blind in oping truly birdie-proof stereo dulators. Even the highly ad- sed integrated-circuit stereo odulators commonly generate s. Further, it now appears hese ICs frequently fail to meet incredible "SCA suppression" fications.

ducing the level of the 67 kHz onent by filtering in the re- r prior to the stereo demodula- ay reduce the severity of the e by as much as 15 dB, at the expense of a severe loss of o separation at the upper audio lating frequencies. It is quite nsive to reject the SCA signal ts sidebands while still passing omposite waveform to 53 kHz a good degree of phase rity.

appears that two items in cular need to be observed in evelopment of a birdie-resistant o demodulator. First, the 19 ilot should not be distorted in emodulator proper, or else the dulator should use a sinusoidal oft" switching waveform in- stead of the brutal but stable and efficient squarewave.

Secondly, the 76 kHz component in the 38 kHz demodulating waveform must be eliminated. Some professional stereo demodulators use a bistable method of generating such a demodulating waveform. By not distorting the pilot, and so not generating the 57 kHz component in the waveform to be demodulated, and by having no 76 kHz component in the demodulating waveform, the 67 kHz signal can be rendered harmless.

In the meantime, I propose a temporary solution. Specifically, keep the average modulation level up so the stereo receivers' gain controls are kept turned down. In this manner the listeners will also turn down the level of the birdie developed in their receivers. The decision to transmit a restricted dynamic range program will be a painful one to make for a classical-music station.

By now it should be clear that adding traps, filters or other magical cures to a transmitter will have no effect if that transmitter was operating reasonably well in the first place. In order for these transmitter-oriented "fixes" to have any effect, the transmitter must have been in a sad state of disrepair.

On the basis of information presented here, I submit that the birdie problem (still) lies in the stereo demodulator. □

Who's Being Gored This Time?

Let's assume that the transmitters referred or alluded to in this article are well maintained and peaked or tweaked to specs. Without this presumption, the article is going to look like a whitewash for the broadcast manufacturers...with all the blame always falling on the receiver manufacturers. For sure, this is an old problem, and since the usual approach to the subject is to kick the broadcast manufacturer in the pants for another snafu, I thought Jim's version might even things up for a while.

If you've had a birdie and gotten rid of it, drop me a line. The response will be used in our Station-To-Station column.

Ron Merrell
Editor

SOCIETY OF
BROADCAST ENGINEERS, INC.
P.O. Box 50844, Indianapolis, Indiana 46250

The Society welcomes three new chapters to the rapidly growing list of active SBE chapters throughout the country: Chapter 46, Baltimore; Chapter 47, Los Angeles; and Chapter 48, Denver. Congratulations to the members for their time and effort in organizing their groups into our newest chapters, whose aim is to encourage involvement at all levels of technical competence and increase the prestige of broadcast engineering. Many other areas throughout the country are organizing their members, recruiting new members, and scheduling first meetings.

CHAPTER REPORTS

Chapter 2—Northeastern Penns vania

John Reiser, FCC, spoke on variety of topics November 7 WVIA-TV/FM in Pittston. Some the topics were: how to request change in rules and regulatio automatic transmitter systems; regulation; AM stereo; FM quad phonic; and upcoming clear chan hearings.

Chapter 3—Kansas

Clay Selthun of Consolidated V eo Systems spoke on satellite ea receiving stations November 8 KTSB-TV, Topeka. The progr dealt with the theory and appli tion of digital time-base correcto Selthun used the CVS model 516 illustration and model 520 for d onstration.

Chapter 16—Seattle, Washington

At the November 9 meeting, J Shawcraft recapped the rec SMPTE technical conference in Angeles. Bob Dietsch, FCC, c cussed current FCC activities in quadraphonic broadcasting, stereo and proposed revisions FCC license exams. Russ William Ampex and Bob Daines of S discussed the proposed SMF 1-inch Type A, B, and C form The Ampex VPR 1 and the S BVH 1000 were demonstrated a the meeting.

Chapter 21—Spokane, Washingt

Meter calibration was discus November 15 at KUID-TV St (University of Idaho campus Moscow, ID).

Chapter 24—Indianapolis, Indian

The chapter met November 8 the IU School of Dentistry for a j meeting with the Audio Enginee Society. The program, presented Caboose Productions, was a teach and discussion session coverin musician's approach to the a recording industry, enginee principles with musical applicat and varying the technical EQ each particular music style.

Chapter 26—Chicago, Illinois

Salvadore Raia, Javelin Elect ics, presented a program on br cast station security and discus the techniques used to pro stations at the November 30 mee in WGN studios. He also prese and discussed surveillance cam and starlite scopes used in n viewing security or ENG applica

pter 28—Milwaukee, Wisconsin

he guest speaker November 15 WTMJ auditorium was Dan erts, Harris Corporation. Rob- slide presentation followed, an explanation of the new ris MS-15 exciter, which utilizes ally-synthesized modulation and amic transient response filtering emes, and the Harris MSP-100 o processor. He also spoke of future of digital audio devices the need for engineers and agement to understand audio essing terminology.

pter 39—Greater Tampa Bay

Everything you always wanted to w about videocassettes... but 't know who to ask," was the c of the December 6 meeting at utive Square Office Park. Rob- J. Kerr, Du Pont magnetic ducts division, described eight pcts of handling ¾-inch video- ettes that will improve oper- n by reducing skew, eliminating s and minimizing mistracking.

pter 40—San Francisco Bay

uad VTR editing techniques was sented by Matt McGillicuddy, pex, at the November 23 meeting ie Ampex Training Center Build- 2. His presentation reviewed the ory of quad VTR editing prob- s and techniques, and included a onstration of the latest Ampex or, the EDM-1, using AVR-3 otape recorders.

pter 43—Sacramento, California

he topic of the November 22 ting in Studio C of KXTV in amento was "An FCC Forum" Joey Landry, FCC western region f. It was an opportunity to meet by FCC officials, ask questions discuss actions currently before FCC.

forming chapters

O, COLUMBUS—William Orr, NS Stations, 770 Twin Rivers e, Columbus, OH 43216; (614) 3700.

NSYLVANIA, ERIE—John Kan- , WJET-TV, 8455 Peach Street, , PA 16509; (814) 864-4902.

TH CAROLINA, CHARLESTON— Becknell, WCSC-AM/WXTC- Box 186, Charleston, SC 29402;) 722-7611.

AS, CORPUS CHRISTI—John gel, KCTA Radio, PO Box 898, pus Christi, TX 78403; (512) 3541.

TEXAS, DALLAS/FORT WORTH—Edward Bates, WBAP-AM/KSCS-FM, 3900 Barnett Street, Fort Worth, TX 76103; (817) 429-2330. Or, Gary Cooper, EEV, 371 Oakview Drive, Lewisville, TX 75067; (817) 430-1373.

TEXAS, HOUSTON—Donald Nash, KYOK-AM, Box 8218, Houston, TX 77004; (713) 526-7131.

VIRGINIA, NORFOLK—Albert Claggett, 1069 Norview Avenue, Norfolk, VA 23513; (804) 855-5957.

WASHINGTON, TRI-CITIES—Dave Bauer, KNDU-TV, PO Box 2523, Tri-Cities, WA 99302; (509) 783-6151.

WASHINGTON, YAKIMA—Dow Lambert, KMWX-AM, Box 702, Yakima, WA 98907; (509) 248-1460.

WEST VIRGINIA, NITRO—James Martin, WMUL-TV, 301 Blackwood Avenue, Nitro, WV 25143; (304) 722-2993.

CANADA, KITCHENER, ONTARIO—J. P. Firminger, CHYM/CKGL-FM, 305 King Street West, Kitchener, Ontario N2G 4E4; (519) 743-2611. □

Making RENG work for you

By Peter Burk

Radio electronic news gathering (RENG) has skyrocketed in popularity over the past two years. The technology has been available for many years. In fact, a few pioneering stations have used high-quality remote pickup equipment complete with mobile repeaters and full duplex cueing systems for remotes and news gathering long before the term RENG was coined.

The problem was that it required considerable expertise to put together a working system. Much of the equipment had to be home-brewed or at least modified for broadcast use. Since many broadcasters lacked this expertise (or at least lacked the time to devote to such a project), RENG remained in the background.

The current popularity was perhaps spawned by television's race to do the same thing with pictures. This not only fired up radio people, it gave manufacturers the extra push necessary to produce ready-to-wear systems.

Whatever the reason, RENG has arrived! It is now possible to purchase a complete system, portable transmitter, mobile repeater and all, practically ready to operate. All you have to do is mount the antennas, connect a few pre-wired cables, and wait for the FCC to issue a license. Well, that's *almost* all; more on that later.

What do you want?

The first problem facing a station wishing to go RENG is to determine the objectives of the system. Every station will have a slightly different idea of what the system should do. A heavy news commitment might indicate a number of units designed to get tape and live voice reports back to the station quickly. A sports-minded station will tailor the system for coverage of various local sporting events with the emphasis on 100% duty cycle for hours at a time. A station wishing to carry live music will look closely at the system fidelity, etc. No one system is *right* for every station.

The station's needs, both present and projected, must be considered carefully before the system is specified. Once these criteria are established, it's time to go shopping. If your experience in VHF and UHF communications is a little weak, fear not; the manufacturers of RPU equipment will offer all kinds of help. They're a friendly lot, and can be trusted to help you put together a successful system.

One station's approach

Rick Neace, operations manager at KRLD in Dallas, is enthusiastic about RENG. To back up what he says, the station has five mobile units and two airplanes equipped with 450 MHz RENG systems. The two airplanes are used to cover traffic during rush hour in Dallas and Fort Worth. The airplanes are each equipped with portable transmitters, pocket scanner receivers, and AM radios. A split headset is used to monitor talkback from the station and the AM program signal. Neace says that the system is working out well, with the reporters frequently cueing each other back-to-back on the air.

Golf tournaments give KRLD a chance to show off. Four Marti RPT-1 portable transmitters are used on the links to make sure there's always a reporter where the action is. With two-frequency units, communications is a snap. The simplest method utilizes one channel for on-air reports and the other for cueing and general communications. All reporters and the anchorman in the tower can hear each other on pocket scanner receivers.

A more elaborate scheme requires the reporters to alternate frequencies. This approach eliminates squelch tails between reports and allows two reporters to carry on an on-the-air dialogue. The channel that is not being used on the air can still be used for cueing. The four portable units combined with a line to the press tent and mixing facilities in the tower make for an impressive golf presentation. Neace says the people at the leader board keep a radio on KRLD to keep up with the tournament.

What about problems?

Neace says that the biggest pro lem at KRLD is getting stati personnel familiar with the syste and it's limitations. Any RF syste is subject to propagation restr tions; it's not a magic black box th will work automatically from a conceivable location.

Most often, though, the proble are people, not hardware. If newsman doesn't get an answ from the news room when he radi in, chances are the radio is wo ing, it's just that no one is in t news room. It's the old tree falli in a forest bit: if no one is there hear the transmission, did it rea exist?

FCC delays are another probl facing RENG users. It seems as if takes an eternity to get a licen granted for an RPU system. It's n the commission's fault; they a severely overloaded. But, it something to take into considerati when planning an installation. Allo several months for the paperwork go through.

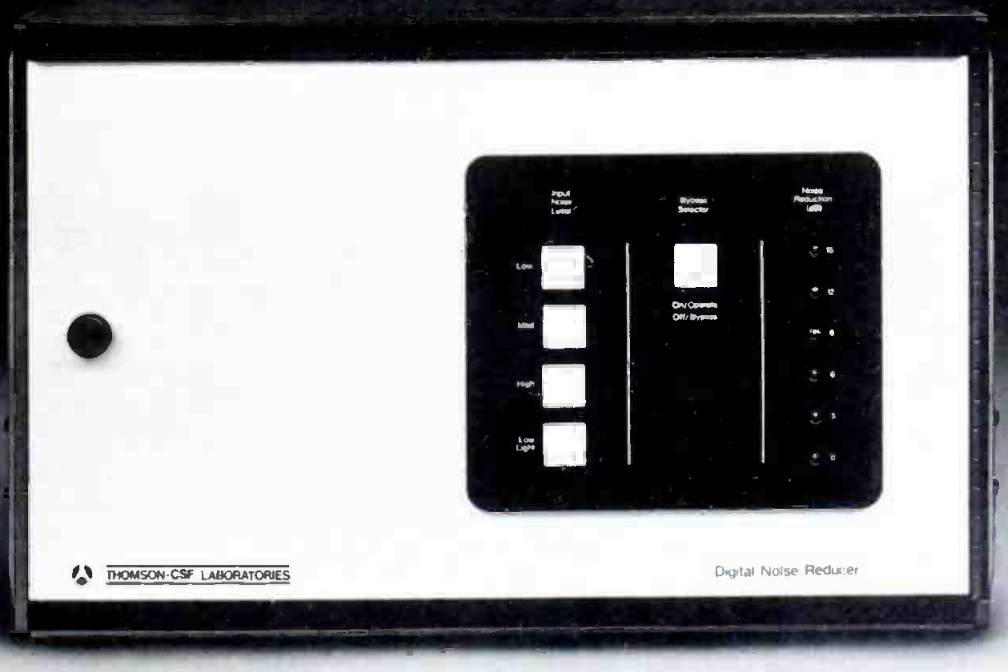
Increasing RENG reliability

One RENG failure can undermi an entire operation if it happe during an important event. It's ea to minimize system failures if y use a little common sense in setti up and operating the system.

Start with a simple plan and sa the bells and whistles for la when you feel comfortable with t basic system. When the pub judges a broadcast, they don't ap a difficulty factor like Olym judges. No one says, "That sounc pretty good, considering that it w a double-hop pickup over rugg terrain," or "My, what a fine sou considering that the path loss w over 90 dB and intermod from f other carriers was driving the c criminator crazy." *100% success a simple remote scores much hig than 80% success on a complica project.*

continued on page

NOISE NOISE NOISE NOISE



leo noise used to be a major problem for television ;ineers. Not anymore. Now it can be detected and ninated with mathematical precision.

Thomson-CSF Laboratories introduces the Model 00 Digital Noise Reducer.

3y analyzing incoming video signals on an element element basis, the Model 9000 Digital Noise Reducer ieves a 12 dB signal-to-signal ratio, with optimal rection upwards of 15 dB. Sounds amazing, and it is. at's the best in the industry!

t provides significant operational value where low- nting or streaky chroma noise makes picture quality or. With the Digital Noise Reducer, a marginal 40 dB ut color television signal becomes a high quality 52 dB put signal. And no objectionable artifacts are introduced. igh quality video exists.

You'll discover dramatic improvements in both studio and remote applications. 2" Multi-generation video tape, U-Matic Multi-generation, Studio Cameras – Electronic film production, Microwave transmission, CATV, Satallite transmission, Off-air reception, Telecine film grain reduction and Electronic Journalism at low light levels are some examples.

Brighten up your picture with the Model 9000 Digital Noise Reducer. From Thomson-CSF Laboratories.

THOMSON-CSF LABORATORIES, INC.

37 Brownhouse Road, Stamford, Connecticut 06902
(203) 327-7700/TWX (710) 474-3346

For More Details Circle (55) on Reply Card

RENG

continued from page 70

Learn the RF limitations of yo system. You may still have to b an occasional telco loop, but that better than having to bail out of sold remote because of a po signal.

Use a map

If your market presents son challenging terrain, it might worthwhile to use a large map indicate good and bad signal area Every time you set up to do remote, stick a colored map pin the map to indicate the performan from that location. Then the ne time you're in that area, you'll kno what to expect.

A topographic map comes handy for distant shots in rur areas. Draw a line from the i tended site to your receive antenn then transfer the terrain height to graph with distance as the x-axi To be accurate you should plot t terrain on a four-thirds earth profi chart, but for fairly short distanc you can get a reasonably good id using a linear graph. Just be sure allow a little margin for error.

If you're using a mobile repeate you'll frequently find situatio where the remote site is hidden terrain, but a nearby high point w be within range of both the r ceiving station and the portable u at the remote site.

Check it out

No matter how carefully you pl on paper, there's still nothing li the real thing. Whenever possib check out the shot well ahead broadcast time. Once you get miliar with your own equipme you can streamline the checkout that it only takes a few minutes. for instance, the antenna mount on the mobile unit puts a signal the receiver that is just a few below what you'll accept, you kn that using a directional antenna v provide sufficient increase in sig strength to make the shot work. Y don't need to go through t exercise of actually setting up antenna.

On the other hand, be sure take into account anything that be different at the time of broadcast. Rick Neace points that one of the problems on a course is the people in the galle KRLD uses a 10-foot aluminum m to get the antenna up above people's heads.

If other stations will be cover the same event, it's a good idea

continued on page

Still *manually* monitoring VITS?

NEW: mi 2914A
• Tighter Specs
$11,500
U.S. Domestic Price Only

mi has the AUTOMATIC answer ether your system is NTSC, PAL or SECAM

aptable to all national VIT waveforms including C #7 and FCC, the **mi** 2914A Insertion Signal alyzer has proven performance with broad- ters and common carriers throughout the world. unattended operations the Analyzer interfaces ectly with telemetry control systems. Combine **mi** 2914A with the optional Limits Comparator, 2915, and the **mi** 2917 Data Selector for a com- te monitoring, measuring and alarm system. can control or print out at a local or remote minal, and, our print-out is now available in English, French or American. As a stand alone unit, the **mi** automatic VITS Analyzer replaces Waveform Monitors, Vectorscopes, Color Gain and Delay test sets and Random Noise Measuring sets. Even the most complex VITS measurement is performed at the push of a button and the result displayed with digital accuracy on the front panel meter.

So if you are still manually monitoring VITS . . . we have the immediate solution . . . contact **mi** today for the new **mi** 2914A specifications.

MARCONI INSTRUMENTS
DIVISION OF MARCONI ELECTRONICS INC.

Stonehurst Court, Northvale, New Jersey 07647 • (201) 767-7250 • TWX: 710-991-9752

For More Details Circle (56) on Reply Card

RENG

continued from page 72

find out what frequencies they'll using and coordinate with the There aren't that many RPU che nels available, so the chances another station trying to operate the same frequency are rea pretty high.

Also allow for interference fr other services. There are usua quite a few two-way users at large event, and some may radiating 100 watts or more ri next to you. About the only w around this problem is to move yo receive antenna farther away. Cr polarization of your antennas hel too, if it's practical.

People problems

If you've done your homewo you can sleep well knowing that t equipment will perform flawless If you want to make sure that t event comes off without a hit though, you'll have to go one st further. Everyone involved mu have a thorough understanding the system. Five minutes before time is not a good time to showing the talent what t switches do. A dry run ahead time will go a long way toward successful broadcast.

"But," you say, "this is great an event that can be planned we in advance. What about hard new You can't plan ahead for a ma fire."

Sure you can! You know t sooner or later, something major bound to happen. Just because don't know where or when is excuse not to plan ahead for Don't wait for a five-alarm fire plan how you'll cover it. W closely with the news director formulate a disaster plan. Ev newsman should be familiar with of the equipment that he must us such a situation. If you want make certain that the coverage be first-class, stage a couple simulated disasters to get the pe familiar with the gear. It'll help find bugs in the system, too.

On routine news beats, m certain that the newsmen formu good operating habits. Wit mobile repeater, for instance, newsman should check the sig back to the station before he lea the vehicle every single time.

Your just reward

RENG can add a lot to the so of your station. It's a lot of wor get started but once it's up running you'll reap the rewards into the future.

rom blue ananas to ag tails

Getting on the stick

few years ago, when I was in the service, I used moonlight with a small, independent TV station ch did remotes of all the local high school sports nts. We would arrive about 6 pm to begin setting since most games began at 8 pm. This usually e us a half-hour break; we would use this time by ing a hot dog roast, cooking the hot dogs by ting them at the end of the microwave horn on loon sticks. This made the hot dogs sizzling hot in ut 10 seconds.

)ne night, about a minute after everyone had taken ir places for the game, we heard a scream of nized terror outside the van. Our PD grabbed the camera hoping to catch a car-pedestrian accident the news, only to find a kid rolling on the ement with a hot dog stuck on the end of a car enna firmly clutched in his hand; and, he was eaming that he had been hit by lightning.

Ve were going to take the boy to the first aid tion and forget about the police, until our producer nd out the antenna was from his car. *Andrew ffin, Springfield, Missouri.* □

Small market modulation alarm system

By Paul Bock, Staff Engineer, Sperry Systems Management

Modulation monitors currently available offer, among various accessories, an external alarm system to signal the operator when modulation is lost. The trouble is, these accessories are usually costly enough that many small-market stations forego purchasing one, thus denying themselves a potentially useful station accessory. The system described here is intended to fill this gap by being simple, effective, and economical to build. Many of the components were obtained from the local Radio Shack store, although no difficulty should be experienced in obtaining suitable parts from other sources.

The basic "building block" (Figure 1) is nothing more than a sound-operated switch, with an adjustable input level control, two LEDs, and a Mallory "Sonalert" audible alarm. Operation is simple: Connect the audio output of the modulation monitor or other audio source t adjust R1 so the relay pulls lighting the green LED. When s is lost, relay K1 will drop out the time delay (set by the value C2 and R2), sounding the alarm lighting the red LED. S2 allows audible alarm to be disconne until the problem is cleared.

Sensitivity of the system in Fi 1 is about 0.5 volts RMS. In event your audio source can't ply this level, the circuit in Figu can be used instead. The FET stage should satisfy any applica requiring higher sensitivity.

Figure 3 shows how several cuits were connected to a com supply and Sonalert to provid three-channel alarm system WSSV/WPLZ in Petersburg. By stalling this system in the control room, the operator is m aware of loss of either or b channels of the automated

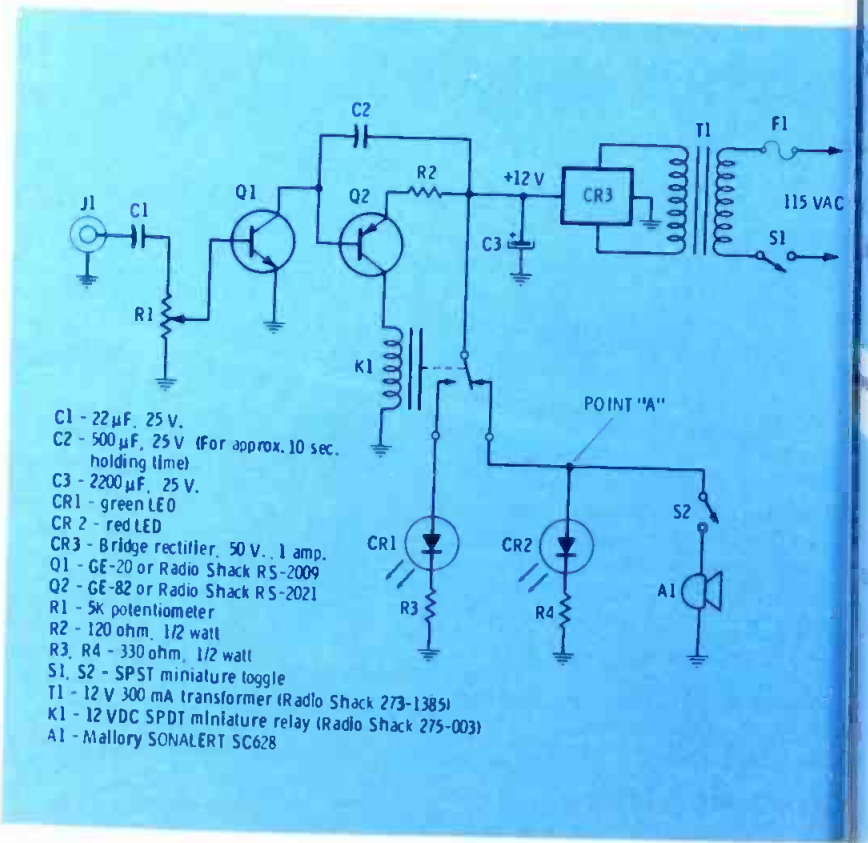
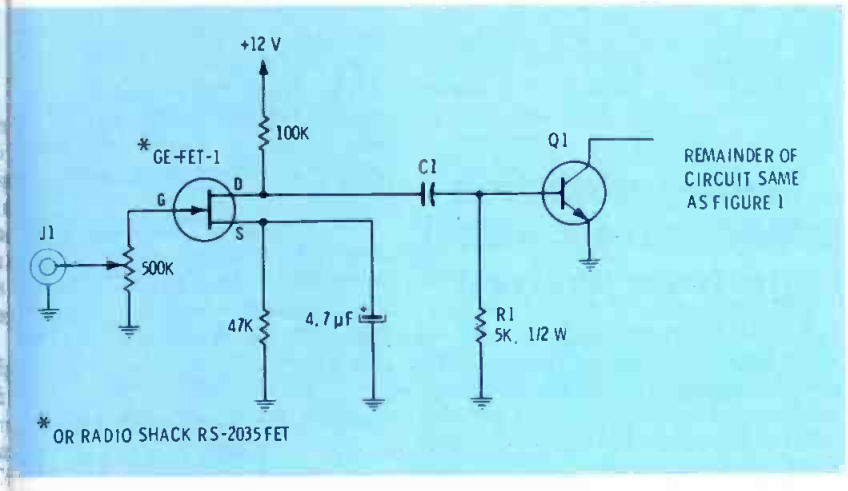


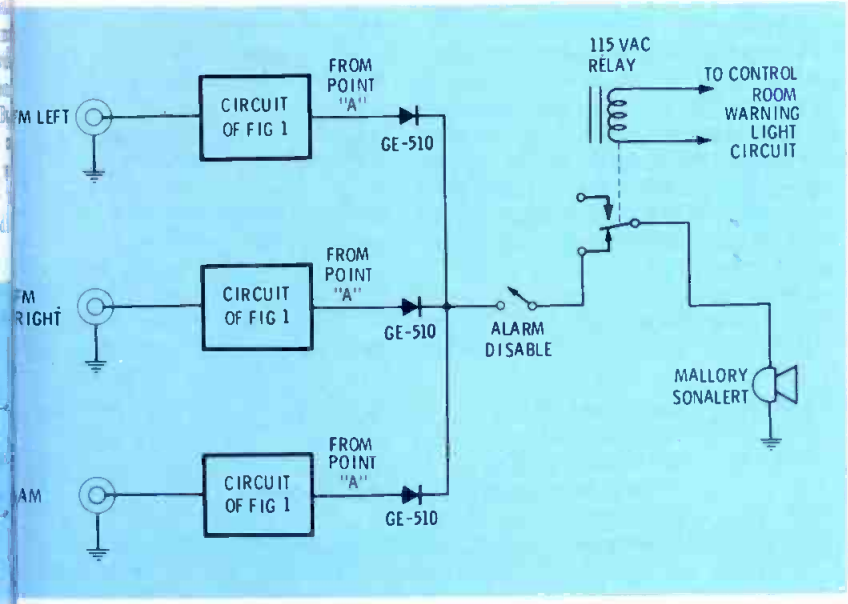
Figure 1

so signal. This is important at t and on weekends, when the rol operator/disc jockey is the person in the studio and is not ally listening to the FM station. wise, the AM alarm is useful ng church services or pre- rded public affairs programs when the operator may be in the newsroom, etc., and not really listening that closely to the program being aired. Note in Figure 3 that the Sonalert is wired through a set of relay contacts controlled by the mike switch to prevent the alarm

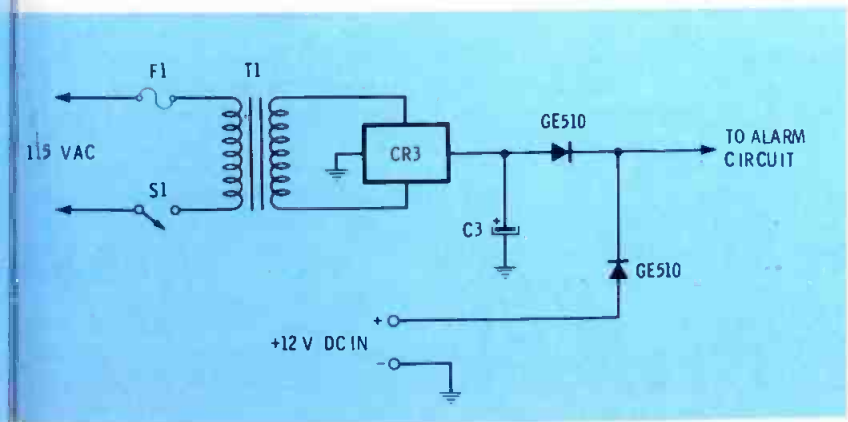
continued on page 78



re 2



re 3



re 4

Station-to-Station

continued from page 77

from blaring forth during a live break.

By using a couple of extra diodes, as shown in Figure 4, the unit can be used in an auto, etc., and thus the chief engineer can know if the station is on the air without listening by connecting the alarm input to his car radio.

Making distortion measurements with a spectrum analyzer

By Mark Wharton,
Broadcast Audio Consultant,
Boulder, Colorado

In reference to Peter Burk's article on AM Proof-of-Performance measurements (June 1977), I'd like to take exception to the statement "there is presently no acceptable way to conduct an official proof-of-performance with a spectrum analyzer...."

I'd like to discuss my favorite method, because it is much simpler and faster. It relies on the use of a programmable pocket calculator, such as the HP25. The calculator is programmed to solve the equation for THD:

$$THD(\%) = \frac{\sqrt{A_2^2 + A_3^2 + \ldots A_n^2}}{A_0} \times 100\%$$

where: A_0 = amplitude of the fundamental
A_2 = amplitude of the second harmonic
A_3 = amplitude of the third harmonic

Since the spectrum analyzer reads out the harmonic amplitudes in dB below the fundamental, t must first be converted to ratios

$$A_n = 10^x$$

where $x = \frac{\text{harmonic amplitude (}}{20}$

Note that if the spectrum analy is adjusted so that the fundame frequency component reads 0 then $A_0 = 1$.

The keystroke listing for HP25 is given in Figure 1. To the program, follow the steps Figure 2. (For a new calculation, to step 2.)

For example, assume that spectrum analyzer shows the sec harmonic to be down 40 dB from fundamental, and the third h monic to be down 48 dB. What the THD?

Input	Keystrokes	Output
40	R/S	1.00%
48	R/S	1.08% Answ

FIGURE 1.

Line	Code	Key en
01	32	CHS
02	31	ENTE
03	02	2
04	00	0
05	71	+
06	15 08	g 10
07	25	Σ +
08	24 06	RCL
09	14 02	f√
10	33	EEX
11	02	2
12	61	X
13	13 03	GTO

FIGURE 2.

Step	Instruction	Data input	Keystrokes	Data ou
01	Enter Program		f PRGM	
02	Initialize		f REG	0.00
03	Input harmonic amplitude in dB below fundamental	a_n	R/S	THD (%
04	Continue with step 03, using as many harmonic terms as is necessary for accuracy desired.			

's that simple! This method is ost as fast as the conventional ortion meter, and is far more rate. The conventional distor- analyzer notches out the fun- entals, and the meter reads all garbage left over. It responds to , noise, and RF pickup; these als are not properly classed as ortion components. The spec- n analyzer allows one to com- total harmonic distortion only; distortion + hum + noise + RF up that the conventional distor- analyzer gives.

you have a spectrum analyzer a pocket calculator, you'll find method far superior to the dis- on analyzer. It gives so much e information and is a valuable oleshooting aid.

Devising a lk-delay system

Don McGuire, KYW, Philadelphia

ichael Russell's article in the ember issue describing WTIC's show delay system reminded me n idea I came up with 12 years at KYW that we used for ng the transition from "live" to ayed" program.

e had just switched to the news" format, and management ded that *all* outside calls (Q & reporters, etc.) should be de- d for protection. We used a lar delay cart machine, with the amount of delay determined by the length of the cart, as normal. How to make the transition from live to delay as simple and goof-proof for non-technical types?

We simply recorded an announcement the exact length of the delay cart telling our listeners that the following was another KYW direct-line report. The cart was cued up to the start and left in the delay machine on standby for the next usage. Then all the airman did was to push the cart "start" button and immediately start talking on the phone.

Starting the delay also switched the transmitter feed from console out to delay-machine out. As the cart rolled, the listener heard the recorded promo followed immediately by the report. Initially, the announcement is played back by the first head, then immediately erased and the phone segment recorded on the second head. Then seconds later (the length of the cart we used), it has cycled around to the play head, tightly following the end of the pre-recorded promo.

Operation simple...one button... and timing of transition was perfect. The idea was so simple and obvious that it couldn't have been original with me, but I never have read or heard of anyone recording the transition fill on the actual delay cartridge. Why delay 10 seconds rather than the normal six or eight? It's much easier to mentally add 10 to your "dump out" time, whether looking at a digital or analog clock. Try it once. □

Does not compute!

Concerning the November article "Micro Computer Controls Traffic for KEZK," General Manager William Clark has asked that certain clarifications be made.

According to Clark, the article was misleading (and being the GM for KEZK, he ought to know). Specifically, the article discusses future objectives as if they are in practice at KEZK today.

As for system costs, Clark pointed out that the figures quoted in the article were not accurate. After all, most of the equipment described was purchased for experimentation only. Clark also feels, and rightly so, that *any* station venturing in this direction should not think that a few black boxes off the shelf can be stacked into a practical system. "The environment," Clark says, "requires much specialized skill, generally far beyond that which is available in all but the largest companies."

"Basic decisions," he continued, "had already been made by myself that if the system were to have the capacity and reliability that would be required in a broadcast station, substantially different equipment would have to be acquired at a greater cost."

new products

Battery pack charger

Frezzolini Electronics Inc. now is offering the Frezzi model BC-77 "Rapid Charger" to full-recharge Frezzi-Belt™ model F-12-77 battery packs that power Ikegami HL-77 or 37 hand-held color cameras.

The unit, said to recharge in one hour or less, is a transformer-type model whose output is AC-source line-isolated. It weighs seven pounds and is housed in a functionally-designed metal cabinet with a carrying handle. All cables and plugs are permanently attached.

The standard Frezzi model BC-77 is priced at $395 and requires 150 watts (maximum) input power from a 115-volt, 50/60 Hz AC source. Optical models operate from either 115/230 volts, 50/60 Hz sources; or from 230 volts 50/60 Hz sources.

For More Details Circle (88) on Reply Card

Remotely controlled ENG antennas

A different approach to microwave linking of ENG crews is being taken by Tayburn Electronics, a manufacturer of complete microwave systems for the aerospace industry who has now entered the broadcast equipment field.

Unlike the currently available quad and super quad omnidirectional antennas, Tayburn specializes in remotely steerable antenna dishes, a number of which can be controlled from a central location such as the TV studio center or the station transmitter site.

A unique feature of this system is a highly sensitive receiver channel which can give an indication of transmitter operation even if the sending dish is pointed 180° away from the receiving point.

The Tayburn ENG package can include a TBM 100 Master Station and Remote Antenna Telecontroller which come in rack mount or desk-top console form. This unit permits the operation of up to four TBA 300 remote dishes mounted in various locations to cover line of sight reception from all over a chosen service area. Ordinary telephone lines are used for the serial digital signals that control the antennas and provide system status feedback to the master station.

Because the system is of modular design, the operator can start w a single link, then expand i greater area coverage as his n or budget increases.

At the antenna end a model T 100 remote station unit controls or two ENG receive dishes and p vides a local override feature testing purposes.

For More Details Circle (89) on Reply Card

Filters

T T E, Inc. announces four filt specifically designed for broadc stations, recording studios, a CATV applications. These are:

Cue Tone Rejection Filter (mo B83); 25 Hz, 600-ohm impedance.

Low-frequency Noise Filter (mo H198); minus 1 dB maximum from Hz to 20 kHz, minus 30 dB at 25 and below, 600-ohm impedance.

Stereo Generator Noise Fil (model J841); ± 0.5 dB from 50 to 15 kHz, minus 30 dB minimum, kHz, minus 50 dB minimum at 2 kHz, 600-ohm impedance.

Bandpass filters, Series K17 K18 for CATV equipment, are av able for any frequency from 100 to 100 MHz, including 15.75 kHz.

For More Details Circle (90) on Reply Card

continued on page

TerraCom has closed the loop for Electronic News Gathering

e TCM-7 "Miniwave" Transmitter and eiver and the TCM-3 Programmable ceiver have joined the TerraCom m. They close the loop for highest rformance microwave . . . from ENG mera, to O.B. van, to repeater, to dio.

Now you can enjoy the satisfaction d cost benefits of using an integrated nily of equipment from one source. raCom.

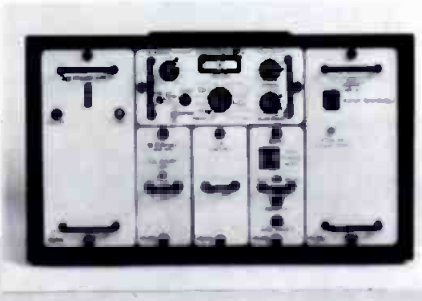
he new TCM-7 and TCM-3 along h the field proven and time tested M-6 Series, tunable or fixed tuned nsmitters and receivers, will meet all of your microwave requirements at any frequency—2, 7, and 13 GHz.

TCM-7 "Miniwave" is TerraCom's camera located transmitter and matching portable receiver. It is lightweight, easy to carry, simple to operate, and fast to set up. And it costs less. Designed for broadcast quality transmission with plug-in circuit cards for maintainability, the "Miniwave" is a new dimension in ENG.

TCM-3 Series Programmable Receivers are an important innovation for ENG systems. Imagine the flexibility of a receiver that can be remotely switched to any channel within the band . . . instantaneously. You are able to make the maximum use of frequencies assigned, or those with least interference, at any one time. All from local control, remote control, or with a telephone circuit.

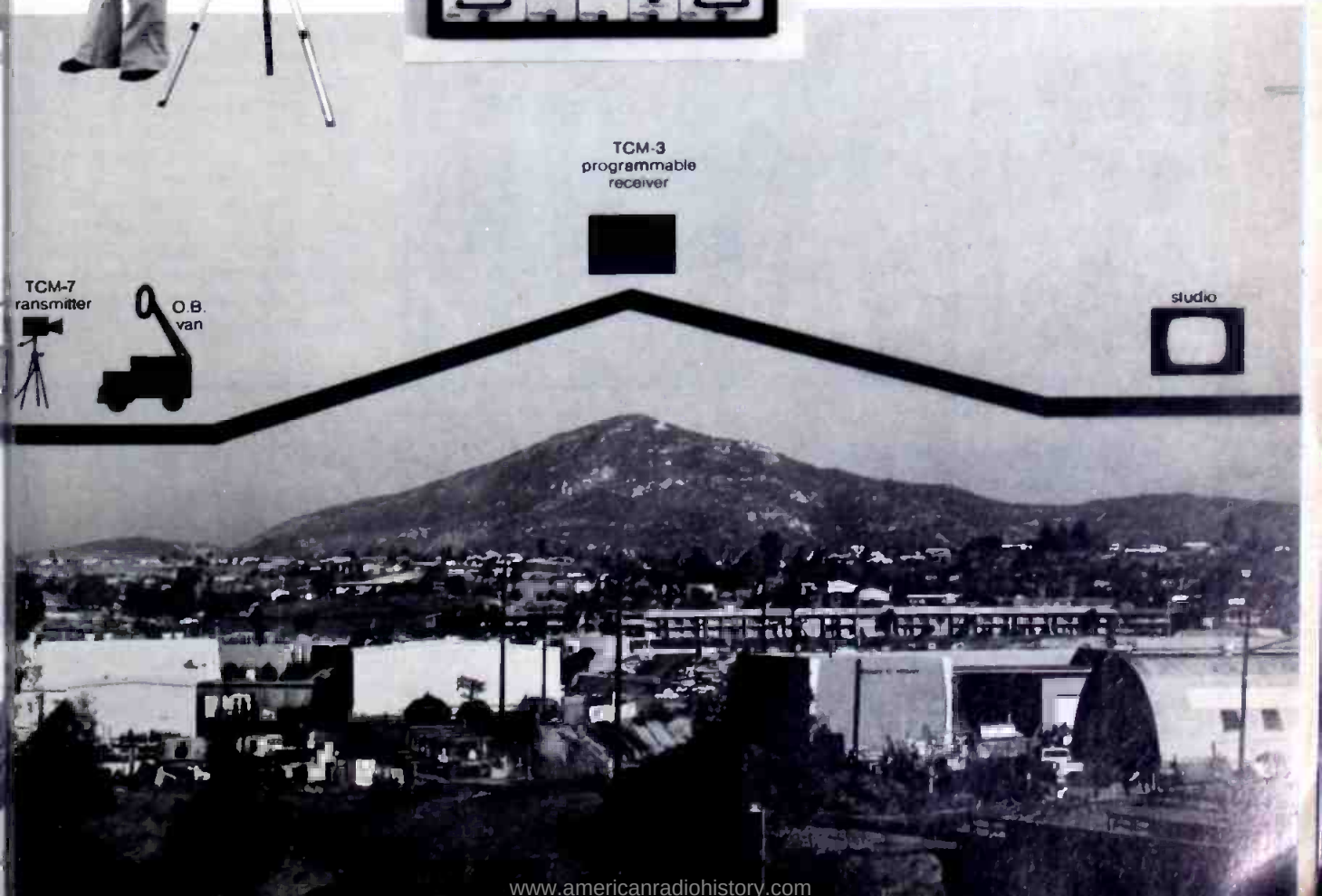
TerraCom portable microwave equipment won user plaudits at the recent Olympics (both Montreal and Innsbruck), primary elections, the Democratic and Republican conventions, Rose Parade, Rose Bowl, Super Bowl and in thousands of other daily events. And we're in satellite earth stations too!

You can close the loop now by calling Bruce Jennings or Bob Boulio at (714) 278-4100. And get the best service in the industry while you're at it.



TERRACOM

DIVISION OF CONIC CORP.
A LORAL SUBSIDIARY
9020 Balboa Avenue, San Diego, CA 92123
For More Details Circle (85) on Reply Card



new products

continued from page 80

Monitor loudspeaker system

A compact monitor loudspeak system designed for broadcast app cations, the 4301 by *JBL*, is useful detecting and controlling spurio noise, such as turntable rumble, a conditioning, and other acoust interference picked up by ope microphones, tapes hiss or cue to leakage.

Specifications include: accurat smooth reproduction 45-15,000 H ±3 dB; 39 dB SPL at 30 feet with 1-milliwatt input; 88 dB SPL at meter with a 1-watt input; 8-inc low frequency loudspeaker; ar 1.4-inch high frequency direct rad ator.

For More Details Circle (91) on Reply Card

Monitor/intercom system

The model 8332 communicatic system by *Automated Processe Inc.*, provides both intercom an monitor functions with broadcas quality audio. Each intercom term nal is connected by 4-wire tel phone-type cable to solid-state cros point switches in the central statio rack. Two-way audio is carried one pair, and the two-way digit data on the second pair.

All control functions are activate and stored in a microprocesso based central processing unit, whic sets up the cross-point signal routin and also indicates system status all appropriate terminals. A tal lamp annunicator indicates sour and destination of calls, conferen calls, busy status, private ca status and monitor status.

Features include: programmab selective lockout for live mike app

ction; hands-off 2-way conversa-n (and conventional press to k); and simultaneous monitor for eing.

For More Details Circle (92) on Reply Card

Miniature mike

The C090 microphone from Elec--Voice measures 3/8-inch diame- and 7/8-inch long, making it al for on-camera use, according the company.

The microphone is supplied with a -bar mount, windscreen, storage uch and six feet of cable which nnects the unit to its belt clip ttery/transformer housing. A ilar model, the C090E can be wered directly from wireless nsmitters. Frequency response is 15,000 Hz with an output level of kB into a low impedance input. The microphone is covered by the mpany's two-year unconditional rranty.

For More Details Circle (93) on Reply Card

Program automation system

Automation Electronics, Inc., an-nces the Autotron/Cuerac. The erac is a computer-controlled ogram automation system that tures a 500-cartridge library for sic and spot recordings in mono stereo.

The system also features reel-to-l, single-play and time-announce ions. Unlimited real time events d up to 30 day walk-away mory are offered as standard tures.

Cuerac is installed "stand alone" in conjunction with Autotron ffic and billing systesm.

For More Details Circle (94) on Reply Card

Reverberation unit

The Quad/Eight CPR-16 computer-grammed reverberation unit es the user control over many

continued on page 84

new products

continued from page 83

aspects of the reverberant field. Reverberation time can be change from zero to 20 seconds in 16 steps even during operation. High and low frequency damping rates can b controlled over a wide range, pre viously possible only by rearrangin a complex array of absorbers in live chamber or room. The im pression of room size can b modified by adding a short dela before the first echo. And, th prominence and density of resonan modes and the density and diffusio of echo rates can be tailored t match any room.

In sound reinforcement and archi tectural acoustics, the CPR-16 ca modify and supplement the roo reverberation characteristics elec tronically without relying on an mechanical devices. Since the CPR 16 is a programmed system, th actual reverberation characteristic can be custom tailored to mee specific requirements.

For More Details Circle (95) on Reply Card

Program switcher

Dynasciences has added a new compact program switcher (mod 7400/A) to its line of televisio studio equipment. The 7400/A ha all of the capabilities of the compa ny's full-size, four-bus model 7400 plus two additional wipe patterns in a package approximately 75 smaller than the 7400.

Measuring 7 inches wide by 8 inches high, the 7400/A contr panel is small enough to mou beside a video program monitor a single 19-inch rack. The reducti in panel size is made possib through the use of a numerical ke board for selecting video input wipe patterns, buses, and effects.

Light emitting diode (LE numerical readouts display th video input selected for each bu as well as the selected wi pattern. Other LED indicators sho effect and bar status.

The 7400/A offers 26 wipes, pl joystick positioning, pushbutton co trolled wipes, and many oth features.

For More Details Circle (96) on Reply Card

¾-inch videocassette evaluator

The Recortec videocassette eval ator (VCE) tests a 60-minute ca sette in under 9 minutes, giving

source selection, and client booth source selection.

Standard rack adapters provide a variety of pre-wired systems: 5 in, 1 out or 10 in, 1 out with solder terminal connections; 5 in, 1 out or 10 in, 1 out with screw terminal connections; and 5 in, 5 out with screw terminal connections.

Systems with screw terminal connections provide control looping between two or three switchers for multi-channel audio and single or dual audio-follow-video systems.

For More Details Circle (98) on Reply Card

Automatic transmitter switcher

A new, solid-state automatic transmitter switcher by *CCA Electronics Corporation* will work with parallel or alternate AM, FM or TV transmitters.

The switcher will automatically sense loss of RF, loss of audio, excessive VSWR, and programmed high or low power limits. It will initiate, and complete, a switchover from one transmitter to another, automatically performing intermediate steps.

It will remove high voltage, reconfigure the antenna switching network, and remove a parallel trans-

continued on page 86

splay of the number of gross video rors and edge damage areas on o electronic counters. Individual Ds indicate the maximum length the cassette. An optional digital inter is available to produce a st record showing the location of ch tape defect.

The VCE is installed on a new P-200 player and is delivered ady to use. The unit can, of urse, be used as a normal ssette player even with the VCE stalled. The VCE employs the me principle of tape evaluation ed by other units for reel-to-reel aluation of ¼-, ½-, 1- and 2-inch deotapes.

For More Details Circle (97) on Reply Card

Audio switcher

The *Dynair* model SW-5985A five-put, one-output audio switcher ovides on-air quality switch tran-tions. The switcher contains in-rnal crosspoint latches and lamp ivers to permit the use of illumi-ated momentary contact control vitches.

The SW-5985A will satisfy a wide ariety of small switching require-ents such as audio console pre-lection, audio tape recorder

new products

continued from page 85

mitter from the circuit. It will also reapply high voltage after determining that no faults remain, and ultimately put the remaining transmitter back on the air directly into the antenna.

For More Details Circle (99) on Reply Card

ENG camera

Two new versions of the HL-77 ENG camera are available from *Ikegami*. Both cameras feature a 10% improvement in signal-to-noise ratio to 51 dB; additional features for remote controlled and systems operation of the camera; and other engineering improvements.

Equipped with Plumbicons as model HL-77AP, the camera provides high sensitivity and low lag. Even newer is model HL-77AS which is equipped with Saticon pickup tubes. The Saticon provides increased picture sharpness.

For More Details Circle (100) on Reply Card

Automatic transmitter control

Telesis, by *Eric Small and Associates*, combines the functions of a conventional remote control, tolerance alarms indicator, and autologger with integrated modules that bring the system into compliance with the current and the proposed automatic transmission system rules of the FCC.

All systems are customized to each station's requirements using a standard questionnaire. The hardware requirements are met by using standard off-the-shelf modules. The unit allows virtually unlimited metering, control and contact sensing channels. It also provides data and alarms to studio operators in clear English, with a minimum of abbreviations.

Several parameters can be displayed while the user adjusts a single parameter. For example, when balancing parallel transmitters by adjusting the power output of one, Telesis can simultaneously display forward power and VSWR for each transmitter.

For More Details Circle (101) on Reply Card

Color video system

The *Merlin* ME-88 high band color quad VTR is available as a complete unit ready for service, or as a kit to upgrade your existing Ampex VR-1100 or other older machine.

e ME-88 is based on a totally bished Ampex transport and e. The transport is modified to rm to SMPTE specifications for canoe dimensions to insure hangeability and proper tape ding. Merlin ME-08 torque mo- ssemblies and the ME-03 air m with venturi vacuum gener- are used.

e color video system interfaces tly to a standard Ampex MK- air bearing video head. An x vertical-lock servo, audio cue chassis, and two-speed an are used. The overhead tor bridge is fitted with a ic video monitor, audio monitor Tektronix 528 waveform moni-

More Details Circle (102) on Reply Card

Optical videodisc

lips and MCA, Inc., have oped an optical videodisc n has a one-hour playing time, ng both sides of the disc.

videodisc is about 2 milli- rs thick and has improved nmental capability. The in- ed thickness of the videodisc res player modifications which nderway at N.V. Philips and avox.

More Details Circle (103) on Reply Card

Microwave system

Farinon FV2-MF microwave system is designed to provide h degree of transmission flex- for ENG/EJ operation or for ard vehicular remote opera- RF channel frequency is phase- d to any of 12 pre-determined al controlled reference fre- cies within the 1990 to 2110 band. A phase-equalized low filter at the video input rejects ra and line noise at the sub- r frequency.

rious combinations of remotely hable aural subcarrier fre- cies are available in the FV2- ystem. In environments where tions are numerous, the use of 4.83 MHz subcarrier reduces ffect of multi-path and the ant loss of carrier due to n rotation. In areas where re- ons are not a problem, the ard 6 to 7 MHz subcarriers be employed. If split-channel tion is desirable, the 4.83 MHz subcarrier provides the re- d narrow transmitter band- .

e basic transmitter (1-watt t) is completely self-contained, ding aural carrier transmitters relay units.

More Details Circle (104) on Reply Card

professional services

advertisers' index

classified

Advertising rates in Classified Section a cents per word, each insertion, and mus accompanied by cash to insure publication.
Each initial or abbreviation counts a full Minimum classified charge, $4.00.
For ads on which replies are sent to u forwarding (blind ads), there is an addi charge of $5.00 per insertion, to cover d ment number, processing of replies, and m costs.
Classified columns are not open to adver of any products regularly produced by n facturers unless used and no longer owne the manufacturer or a distributor.

TRAINING

TRAINING (Cont.)

FCC first and second class exams with 1-lesson, 450-page course. Starts with electricity. Over 600 FCC-type, multiple-questions and sample exams included. No technical knowledge required. Complete Radio Operator Theory Course, #15-01. $5.95. Ameco Publishing, 275G Hillside Williston Park, N.Y. 11596. 8-72-tf

FCC EXAMS with Ameco books. Each contains FCC questions plus simplified plus FCC-type exams and answers. 3rd includes broadcast endorsement $1.25. 2nd 2.50, 1st class $1.60. Free catalog. Ameco ing, 275G Hillside Ave., Williston Park, 596. 8-72-tf

ers intensive but quality instruction for 1st d class FCC license preparation. State ed for Veterans training. Student housing. rochure. 2402 Tidewater Trail, Fredericks-'a. 22401 or Phone 703-373-1441. 7-77-8t

THAM'S FCC LICENSE STUDY GUIDE—377 16 FCC-type practice tests, 1465 ques-with answers and discussions—covering second, and first class license exams. postpaid. GSE Publications, 2000 Stoner os Angeles, CA 90025. 10-77-tf

RONICS DEGREE by correspondence. No ing to class. Study at your own pace. with basics and continue, first for A.S.E.T. en for B.S.E.E. For free brochure, write ation Desk, Grantham College of Engineer-00 Stoner Avenue, Los Angeles CA 90025. 10-77-tf

HELP WANTED

ergence Corporation, the lead-nanufacturer of Editing Control ems, has the following em-ment opportunities immediately able:

GERIAL SALES POSITIONS—Experi-sales managers wanted to assume sibility for regional dealer/distributor of post production equipment. Requires d background in video sales repre-g a manufacturer—TV production back-d helpful. BS in Engineering and/or ling and five years field sales ex-ce preferred.

ent salary/commission plan.

UTER SOFTWARE DESIGNER—Out-ng opportunity for an aggressive top-computer software designer who wants and his career. MSEE degree plus a um of five years experience in software n and development required. Prefer iates who have high technology tele-broadcast experience. Strong mana-background necessary to be considered ed.

CT MANAGER—Immediate need for an ive with extensive project management ence in high technology and video disciplines to head-up a new product pment team.

lified candidate must have an MSEE and five years experience, or BSEE 0 years experience.

include excellent starting salaries ensurate with ability and experience benefit package which includes life, al and dental insurance.

lified applicants submit your resume ecent salary history, in complete ence to:

rgence Corporation, Personnel Depart-17935 Sky Park Circle, Irvine, CA 92714.

An Equal Opportunity Employer

SION—CCTV Video Maintenance Tech-. Full Benefits. Greater New York, Suffolk or New Jersey Area. Send resume to: .O. Box 268, New Hyde Park, N.Y. 11040. 6-77-tf

HELP WANTED (CONT.)

ENGINEERING POSITIONS ($15,000-$40,000)—Openings at all locations coast to coast—all levels and disciplines. Over 1,000 firms represented. To cover ALL your immediate job possibilities in the "unpublished" market, send your resume with salary requirements now. No fee, confidential, professional. KEY PERSONNEL, NATIONAL HEADQUARTERS, South Main Towers, Wilkes-Barre, Pa. 18701, (717) 822-2196. 1-78-TFN

REMOTE TV ENGINEER. For studio and remote operations. FCC license required. Must have technical and operating background. Send resume and salary requirements to: Chief Engineer, WTCG-TV, 1018 West Peachtree St., Atlanta, Georgia 30309. 1-78-2t

TRANSMITTER SUPERVISOR—With minimum 3 years experience for an AM 5 KW 3 Tower directional. Break-in period can start immediately. Send resume to Chief Engineer, WMCA, 888 7th Avenue, N.Y., N.Y. 10019. An Equal Opportunity Employer. 12-77-2

AV TECHNICIAN: Immediate opening at Northeastern University. Will perform a variety of mechanical and electronic troubleshooting, diagnosis, repair and calibration operations on an AV CCTV microwave transmission equipment and synchronizing generators calibrated to FCC standards. Requires thorough knowledge of the technical field of electronics with training equivalent to two years of technical college. Need first class FCC radio-telephone license. Excellent salary and benefits including free college tuition. Send resume and salary history to K. B. Keeler, 101 Hayden Hall, Northeastern University, Boston, MA 02115. An Equal Opportunity/Affirmative Action Title IX University. 1-78-1t

WANTED: AN ELECTRONICALLY ORIENTED WHIZ KID. Combination videotape editor and maintenance man for offline system. We are a hot shop producing national commercials and shows. Only the best will do. All replies confidential. Send resume to: Bob Kiger, Videography Company, 8440 Santa Monica Blvd., Los Angeles, Ca. 90069. Salary Open. 1-78-1t

CHIEF ENGINEER/FM RADIO—Excellent career opportunity for FCC First Class Engineer-Major Broadcast Group, excellent benefits, 100,000 Watt Stereo. Should be experienced in transmitter work, STL and have strong audio background. Salary open depending on experience and ability. Equal Opportunity Employer. Contact 813-576-0950 between 9AM-5:30PM or P.O. Box 20147, St. Petersburg, Fla. 33742. 1-78-1t

VIDEO AND AUDIO ENGINEERS needed immediately for expanding tele-production facility. Experience with remote, commercial and sports productions preferred. Submit resumes to Dept. 399, Broadcast Engineering, P.O. Box 12901, Overland Park, Kansas 66212. 12-77-2t

ASSISTANT CHIEF ENGINEER OF MAINTENANCE, independent videotape production facility. Emphasis on digital controlled equipment. Send resume and salary requirements to Dept. 400, Broadcast Engineering, P.O. Box 12901, Overland Park, Kansas 66212. 12-77-2t

TELEVISION ENGINEER: KNMT-TV, Walker, Minnesota, NBC affiliate has opening for Engineering Supervisor. Person must be fully experienced in maintenance of studio, transmitter and microwave equipment. Permanent position in beautiful lake area. Excellent benefits. Address resume and salary requirements to Carl Iverson, Chief Engineer, KCMT-TV, Alexandria, Minnesota 58308. An Equal Opportunity Employer. 1-78-1t

WANTED: Combo-man with engineering ability, FCC First Class, able to maintain automation system and stereo FM operation. Contact Manager, WDBI-FM, Tawas City, Michigan. 1-78-2t

MANUFACTURERS REPRESENTATIVES. Ramko Research Inc., a major manufacturer of audio consoles and professional broadcast equipment is presently establishing a Rep. sales force. Exclusive territories are available in most areas. Send resume and line list to Jack M. Ducart, Sales/Marketing Mgr., Ramko Research, 11355-A Folsom Blvd., Rancho Cordova, Ca. 95670. 12-77-2t

HELP WANTED (CONT.)

TELEVISION ENGINEERING technician needed for new corporate communications center. Must be capable of operation/maintenance of color studio, EFP, quad, helical and editing facilities. 30% travel required. Reply with salary history to R. J. Hope, P.O. Box 538, Allentown, PA 18105. 1-78-1t

VIDEO MAINTENANCE and production engineer. Three job openings in industrial video production facilities. Various locations. Job requires extensive experience with helical or quad equipment, both set up and maintenance. Outstanding organizations. Opportunity for growth and advancement. Salary $16,000 to $25,000. Send resume, job objective and salary history to Willard Thomas, Organizational Media Services, 13904 South State Street, Riverdale, Ill. 60627. 12-77-1t

DIRECTOR OF ENGINEERING—Centrally located top fifty market equal opportunity employer. AM-FM-TV with subsidiary production company. Ideal career opportunity for number two person in major market who is now ready to assume complete responsibility for the total radio-TV technical operation, including supervising a staff of fifty-five. A degree and a minimum of five years experience in technical management of radio and TV are required. Salary is commensurate with experience. Excellent fringe benefits. Position is available immediately. Send a complete resume detailing experience, education, technical qualifications and salary requirements to Dept. 406, Broadcast Engineering, P.O. Box 12901, Overland Park, Kansas 66212. 1-78-1t

UNIT SUPERVISOR. Major west coast video production facility needs experienced mobile unit Supervisor. Complete responsibility for equipment and crew performance as well as client interface on location shoots. State of the art cameras and video tape equipment. Send resume and salary requirements to Dept. 405, Broadcast Engineering, Box 12901, Overland Park, KS 66212. 12-77-2t

WE ARE PRESENTLY SEEKING a competant maintenance technician to occupy a supervisory position at our remote controlled transmitter. Studio experience helpful; professionalism necessary. Call 304/525-7661. Equal Opportunity Employer. 12-77-tf

CHIEF ENGINEER—quality oriented—for AM Directional and High Power FM station. Formal electronics training required. Send detailed resume and salary requirements to: Director Engineering, Box 6002, Roanoke, Virginia 24017. 1-78-2t

WE ARE LOOKING FOR A FIRST RATE EXPERIENCED TECHNICIAN capable of caring for a wide range of modern equipment in a large network affiliate. Must have a solid technical background and be heave on **EXPERIENCE** in most of the following: cameras, switchers and production facilities; transmission equipment and microwave; quad and helical VTR; audio mixing and recording equipment; digital devices; E.N.G., etc. First Phone required. Swing and some night shifts. Send full resume to Bob Plummer, KOMO-TV, 100-4th Ave. No., Seattle, Wa. 98109., (206) 223-4027. Equal Employment Opportunity Employer. 12-77-3t

UNIT SUPERVISOR. Major west coast video production facility needs experienced mobile unitsupervisor. Complete responsibility for equipment and crew performance as well as client interface on location shoots. State of the art cameras and video tape equipment. Send resume and salary requirements to Dept. 405, Broadcast Engineering, Box 12901, Overland Park, KS 66212. 12-77-2t

CHIEF ENGINEER for University telecommunications center. Will have technical responsibility for modern broadcast TV, FM and CCTV facility. Qualifications include: BS in related field, demonstrated state of the art technical knowledge, leadership ability, and FCC first. Equal Opportunity Employer. Send resume, references and salary requirements to: Dept. 407, Broadcast Engineering, P.O. Box 12901, Overland Park, Kansas 66212. 1-78-2t

EQUIPMENT FOR SALE

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

MICA AND VACUUM transmitting capacitors. Vacuum relays. Large stock; immediate delivery. Price lists on request. SURCOM ASSOCIATES, 305 Wisconsin Ave., Oceanside, Ca 92054, (714) 722-6162. 3-76-tf

RAZOR BLADES—Single Edge, Tape Editing, Raltec, 25884B Highland, Cleveland, Ohio 44143. 4-77-12t

CARTRIDGE LABELS: New, non-smear pressure sensitive labels. Fits all cartridges. Comes white & 4 colors. Write for FREE sample—MASTERTONE COMPANY, 1105 Maple, West Des Moines, Iowa 50265, (515) 225-6122. 8-77-tf

BROADCAST CRYSTALS for AM, FM or TV transmitters, frequency change, repair or replacement of oven types. Also vacuum types for RCA, Gates, Collins, etc. transmitters. Quality products, reasonable prices and better delivery! Don't be without a spare crystal. Frequency change and service for AM and FM monitors. Over 30 years in the business. Eidson Electronic Co., Box 96, Temple, Texas 76501. Phone (817) 773-3901. 12-74-tf

BROADCAST AND STUDIO EQUIPMENT. New and used. Cart and reel recorders, consoles, limiters, monitors, mic's, turntables, preamps, speakers, racks, furniture, reconditioning services, parts (including PT6). Authorized Spotmaster distributors. Contact us for best prices and trade-in deals. AUTODYNE, P.O. Box 13036, Orlando, Fla. 32809, (305) 855-6868. 9-77-tf

AUTOMATION SPARE PARTS for 500 system Automation. SESCO Inc., Mt. Vernon, WA 98273, (206) 424-6133. 10-77-4t

RCA TK-42 COLOR CAMERAS—Top working condition cable, lens, enhancers, power supply, control units, etc. Only $5,900.00 ea. Originally sold at $85,000.00 ea. LDH-20 available, complete; **FACTORY NEW** or demonstrator **LEAD-OXIDE TUBES, TRANSMITTING TUBES, QUARTZ LAMPS** offered at big discounts. Temtron Elec., (212) 978-5896 or T.F. 800-221-8376. 1-78-1t

TWO AMPEX VR-3000 Portable High Band Videotape Recorders, with three video heads, battery packs, battery chargers and body braces. Top operating condition and sensibly priced. Videocom, 617-329-4080. 12-77-2t

SONY D-100's. Grass Valley Switcher, Noreico Audio Console, Time Base Corrector and Datatron Editing Controller. Reasonably priced. Call 202-783-2700. 1-78-1t

TWO AVR-1's—One with editor. One Ampex VR2000C fully loaded. CMX 300 system also available. For information write Dept. 404, Broadcast Engineering, P.O. Box 12901, Overland Park, Kansas 66212. 12-77-2t

BROADCAST AUDIO FROM STOCK. Scully, UREI, Revox, Spotmaster DBX, Shure, Electro-Voice, AKG Russco, Micro-Trak, Techinics Beyer, Stanton, and much more from stock. WRH, Five Industrial Way, Riverside, RI 02915. Phone (401) 434-6272 today. Ask for our free lines card.1-78-1t

IKEGAMI HL-331A FOR SALE. Includes 3 Frezzolini batteries, 1 charger, various lengths of camera cable, aluminum travel cases. New 10/75. 212-532-3193. 1-78-1t

REWARD

REWARD: INFORMATION LEADING TO ARREST AND CONVICTION of person or persons involved in theft of TK-76 camera, Serial #01261 and/or OM-8-A Audio Console, Serial #1165. National Broadcasting Company, Inc., 3000 West Alameda Avenue, Burbank, California 91523. Telephone: 845-7000, Ext. 2346. 12-77-2t

EQUIPMENT FOR SALE (CONT.)

GATES MO-2639 MODULATION MONITOR. $100. Assorted Maggie PT-6 decks & amps for parts, make offer. 2 Gates SA-40 consoles, in service. IGM model 400 real time module, brand new. 4-K Radio, Inc., Box 936, Lewiston, Idaho 83501. 1-78-1t

LIGHTING DIMMER SYSTEM for sale. 32 - 3K dimmers, 32 faders with 16 preset memory console. Packed for touring. Must sell/ BC & G Enterprises, P.O. Box 1036, Littleton, Colorado 80160, (303) 751-5991. 1-78-1t

REPLACEMENT PREAMPLIFIER for OTARI ARS-1000 tape deck. Highest quality, multiturn level adjustment, American I.C. in socket, glass P.C. board. $80.00. Iowa Development Labs, Box 1913, Iowa City, Iowa 52240. 1-78-2t

FOR SALE OR TRADE: Teac tape recorder #A3340, 250' of 7/8" coaxial cable with hardware, Mosley Stereo Generator #SCG-3T, CBS Audimax III S, and Volumax 411. WTAO-FM, Rt. 5, Box 286, Murphysboro, Ill. 62966. 1-78-1t

FREQUENCY MONITOR—Gates AF-80 Digital Readout, Rack mount AM frequency monitor—Never used. Gates says freq. can be set for any freq. from 540-1600 KHz. by changing internal jumpers. Now tuned to 1240 KHz. Make offer. Tri-Tronics, P.O. Box 1067, Lillington, NC 27546. 1-78-1t

WANTED

WANTED: All surplus broadcast equipment especially clean A.M. & F.M. transmitters, capacitors, 112 Clark & Potomac Phase monitors, Field Strength Meters, etc. High prices. All custom duties paid. Surplus Equipment Sales at 2 Thorncliffe Pk. Dr., Unit 28, Toronto 17, Ont., Canada (416) 421-5631. 1-76-tf

WANTED: 4W20,000A tubes. Lloyd Erickson, Phone 701/282-0444. 1-78-1t

WANTED: 250-500 watts FM stereo transmitter. WTAO-FM, Rt. 5, Box 286, Murphysboro, Ill. 62966. 1-78-1t

WANTED: Pre-1926 radio equipment and tubes. August J. Link, Surcom Associates, 305 Wisconsin Ave., Oceanside, Ca. 92054, (714) 722-6162. 3-76-tf

WANTED TO BUY: Will pay cash for your excess tubes of any description; transmitting, klystrons, receiving, camera vidicons, lead-oxide, I.O.'s, etc. Can also use 1 watt microwave, RCA or equal; cameras and equipment. Reply to S & M Associates, 1231 Waterview Street, Far Rockaway, New York 11691. 1-78-1t

AMPEX VR2000, 1200, 1100 or AVR series to rent for at least six months or to buy. We will move, install and return machine. Mr. Lindsey, One Pass Video, Inc., 900 Third Street, San Francisco, California 94107. (415) 777-5777, collect. 12-77-2t

WANTED: Student radio station desires donations of studio and technical equipment of all types for AM and/or CA FM broadcasting. Donations will be acknowledged for tax purposes. Contact: WNDR Radio, Penn State University, Capitol Campus, Middletown, Pa. 17057. 1-78-1t

WANTED—10 WATT FM EXCITER or transmitter antenna, studio equipment, and coaxial cable for a black community center. Donations are tax deductable. Contact Mr. H. Johnson, Booker T. Washington Center, 24 Chapman Ave., Auburn, New York 13021, (315) 252-1842. 12-77-2t

WANTED: AMPEX VR 2000, 1200, 1100 or AVR series to rent for at least six months or to buy. We will move, install and return machine. Mr. Lindsey, One Pass Video, Inc., 900 Third Street, San Francisco, California 94107. (415) 777-5777, collect. 12-77-2t

NON PROFIT TAX EXEMPT ORGANIZATION about to build Christian FM radio station. Welcome contributions of good used equipment. Sound of Life Incorporated, 37 Henry Street, Kingston, N.Y. 12401. 1-78-1t

SERVICES

FREQUENCY MEASURING SERVICE—WE
—MONITOR REPAIRS—MOBILE UNIT—
Northern ⅔ Ill., Eastern Iowa, Eastern
Southern ⅔ Wis., Western Mich., and W
Ind., monthly. Radio Aids, 528 Ravine Ave.,
Bluff, Illinois 60044, (312) 234-0953.

COMMERCIAL RADIO MONITORING CO.
sion frequency measurements since 1932,
and mobile service covering entire midwest
Test instruments, counters, monitors re
and certified. Lee's Summit, Mo. 64063.
524-3777

ONE STOP FOR ALL YOUR PROFESSI
AUDIO REQUIREMENTS. Bottom line pri
F.T.C. Brewer Company, P.O. Box 8057, F
cola, Florida 32505.

HELIAX-STYROFLEX. Large stock—ba
prices—tested and certified. Write for pric
stock lists. Sierra Western Electric. Box
Oakland, Calif. 94623. Telephone (415) 832

BUILD YOUR OWN TV AND RADIO PRO
TION EQUIPMENT. Easy, inexpensive, (n
IC). Plans or kits: Special Effects Gen
Automatic Logger, Vertical Interval Video S
er, Solid State Lighting Board, Preset
Video Board, Preset Lighting Board, Crystal
trolled Wireless Mikes with Matching rec
Subsonic Tone Control for audio tapes,
SOF Cameras and Projectors, Distribution
fiers (Sync. Video, Audio), Audio Control B
(Studio & Remote) Proc-Amp with compen
and regeneration for adapting Helical Scan
to broadcast standards. PLUS specialized
spondence courses in TELEPHONE Engin
($39.50), and Integrated Circuit Engine
($49.50). Plans from $5.95 to $15. S
CATALOG plus years updating of new devic
Mailed $1.00. Don Britton Enterprises,
Drawer G, Waikiki, Ha. 96815.

CARTRIDGE RECONDITIONING SER
CLEANING—NEW PARTS—NEW TAPE. 12
Experienced Personnel. Write for addition
formation & price sheet. MASTERTONE CO
NY, 1105 Maple, West Des Moines, Iowa
515-225-6122.

SAVE HUNDREDS OF DOLLARS on high q
dependable, American Made, MATV Head
V/V, U/V Converters, Camera Modulato
factory-direct prices. Send $5.00 (or your
Installers Letterhead). "Information," Box
Boynton Beach, Fla. 33435. 1-78

TOWER PAINTING AND LIGHTING: Servic
maintenance contracts offered. Pioneer
Service, P.O. Box 253, Carrollton, Mis
64633, (816) 542-0840.

READER SERVICE CARD

BROADCAST ENGINEERING®

For issue of January 1978—Use until April 1, 1978

After that date please contact manufacturer direct.

Use this handy card for more information on the products described.

Name _____ **Title** _____

Station or Company _____

Address/City _____

State _____ **Zip** _____ **Phone (** __**)** _____

3	25	37	49	61	73	85	97	109	121	133	145	157	169	181	193	205	217	229	241	253	265	277	289	301	313
4	26	38	50	62	74	86	98	110	122	134	146	158	170	182	194	206	218	230	242	254	266	278	290	302	314
5	27	39	51	63	75	87	99	111	123	135	147	159	171	183	195	207	219	231	243	255	267	279	291	303	315
6	28	40	52	64	76	88	100	112	124	136	148	160	172	184	196	208	220	232	244	256	268	280	292	304	316
7	29	41	53	65	77	89	101	113	125	137	149	161	173	185	197	209	221	233	245	257	269	281	293	305	317
8	30	42	54	66	78	90	102	114	126	138	150	162	174	186	198	210	222	234	246	258	270	282	294	306	318
9	31	43	55	67	79	91	103	115	127	139	151	163	175	187	199	211	223	235	247	259	271	283	295	307	319
0	32	44	56	68	80	92	104	116	128	140	152	164	176	188	200	212	224	236	248	260	272	284	296	308	320
1	33	45	57	69	81	93	105	117	129	141	153	165	177	189	201	213	225	237	249	261	273	285	297	309	321
2	34	46	58	70	82	94	106	118	130	142	154	166	178	190	202	214	226	238	250	262	274	286	298	310	322
3	35	47	59	71	83	95	107	119	131	143	155	167	179	191	203	215	227	239	251	263	275	287	299	311	323
4	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324

Please check every section which applies to you.

BUSINESS OR OCCUPATION

- ☐ A. AM Radio Station
- ☐ B. FM Radio Station
- ☐ C. TV Station
- ☐ D. ETV Station
- ☐ E. CATV Facility
- ☐ F. CCTV Facility
- ☐ G. Consulting Engineer
- ☐ H. Educational Radio
- ☐ I. Recording Studio
- ☐ J. Distributor
- ☐ K. Government Agency
- ☐ L. Corporate Officer
- ☐ M. Technical Management/Engineering
- ☐ N. Other Management
- ☐ O. Other (specify) _____

READER SERVICE CARD

BROADCAST ENGINEERING®

For issue of January 1978—Use until April 1, 1978

After that date please contact manufacturer direct.

Use this handy card for more information on the products described.

Name _____ Title _____

Station or Company _____

Address/City _____

State _____ Zip _____ Phone (__) _____

3 25 37 49 61 73 85 97 109 121 133 145 157 169 181 193 205 217 229 241 253 265 277 289 301 313
4 26 38 50 62 74 86 98 110 122 134 146 158 170 182 194 206 218 230 242 254 266 278 290 302 314
5 27 39 51 63 75 87 99 111 123 135 147 159 171 183 195 207 219 231 243 255 267 279 291 303 315
6 28 40 52 64 76 88 100 112 124 136 148 160 172 184 196 208 220 232 244 256 268 280 292 304 316
7 29 41 53 65 77 89 101 113 125 137 149 161 173 185 197 209 221 233 245 257 269 281 293 305 317
8 30 42 54 66 78 90 102 114 126 138 150 162 174 186 198 210 222 234 246 258 270 282 294 306 318
9 31 43 55 67 79 91 103 115 127 139 151 163 175 187 199 211 223 235 247 259 271 283 295 307 319
0 32 44 56 68 80 92 104 116 128 140 152 164 176 188 200 212 224 236 248 260 272 284 296 308 320
1 33 45 57 69 81 93 105 117 129 141 153 165 177 189 201 213 225 237 249 261 273 285 297 309 321
2 34 46 58 70 82 94 106 118 130 142 154 166 178 190 202 214 226 238 250 262 274 286 298 310 322
3 35 47 59 71 83 95 107 119 131 143 155 167 179 191 203 215 227 239 251 263 275 287 299 311 323
4 36 48 60 72 84 96 108 120 132 144 156 168 180 192 204 216 228 240 252 264 276 288 300 312 324

Please check every section which applies to you.

BUSINESS OR OCCUPATION

☐ A. AM Radio Station
☐ B. FM Radio Station
☐ C. TV Station
☐ D. ETV Station
☐ E. CATV Facility
☐ F. CCTV Facility
☐ G. Consulting Engineer
☐ H. Educational Radio
☐ I. Recording Studio
☐ J. Distributor
☐ K. Government Agency
☐ L. Corporate Officer
☐ M. Technical Management/Engineering
☐ N. Other Management
☐ O. Other (specify) _____

READER SERVICE CARD

BROADCAST ENGINEERING®

For issue of January 1978—Use until April 1, 1978

After that date please contact manufacturer direct.

Use this handy card for more information on the products described.

Name _____ Title _____

Station or Company _____

Address/City _____

State _____ Zip _____ Phone (__) _____

3 25 37 49 61 73 85 97 109 121 133 145 157 169 181 193 205 217 229 241 253 265 277 289 301 313
4 26 38 50 62 74 86 98 110 122 134 146 158 170 182 194 206 218 230 242 254 266 278 290 302 314
5 27 39 51 63 75 87 99 111 123 135 147 159 171 183 195 207 219 231 243 255 267 279 291 303 315
6 28 40 52 64 76 88 100 112 124 136 148 160 172 184 196 208 220 232 244 256 268 280 292 304 316
7 29 41 53 65 77 89 101 113 125 137 149 161 173 185 197 209 221 233 245 257 269 281 293 305 317
8 30 42 54 66 78 90 102 114 126 138 150 162 174 186 198 210 222 234 246 258 270 282 294 306 318
9 31 43 55 67 79 91 103 115 127 139 151 163 175 187 199 211 223 235 247 259 271 283 295 307 319
0 32 44 56 68 80 92 104 116 128 140 152 164 176 188 200 212 224 236 248 260 272 284 296 308 320
1 33 45 57 69 81 93 105 117 129 141 153 165 177 189 201 213 225 237 249 261 273 285 297 309 321
2 34 46 58 70 82 94 106 118 130 142 154 166 178 190 202 214 226 238 250 262 274 286 298 310 322
3 35 47 59 71 83 95 107 119 131 143 155 167 179 191 203 215 227 239 251 263 275 287 299 311 323
4 36 48 60 72 84 96 108 120 132 144 156 168 180 192 204 216 228 240 252 264 276 288 300 312 324

Please check every section which applies to you.

BUSINESS OR OCCUPATION

☐ A. AM Radio Station
☐ B. FM Radio Station
☐ C. TV Station
☐ D. ETV Station
☐ E. CATV Facility
☐ F. CCTV Facility
☐ G. Consulting Engineer
☐ H. Educational Radio
☐ I. Recording Studio
☐ J. Distributor
☐ K. Government Agency
☐ L. Corporate Officer
☐ M. Technical Management/Engineering
☐ N. Other Management
☐ O. Other (specify) _____

PLACE
FIRST CLASS
POSTAGE
HERE

BROADCAST ENGINEERING
P.O. Box 17252
Denver, CO 80217

Attn: Engineers Tech Data Dept.

PLACE
FIRST CLASS
POSTAGE
HERE

BROADCAST ENGINEERING
P.O. Box 17252
Denver, CO 80217

Attn: Engineers Tech Data Dept.

PLACE
FIRST CLASS
POSTAGE
HERE

BROADCAST ENGINEERING
P.O. Box 17252
Denver, CO 80217

Attn: Engineers Tech Data Dept.

BROADCAST ENGINEERING

P.O. Box 12901, Overland Park, Kansas 66212

FREE Subscription Form

PORTANT Do you wish to receive or continue ceiving your free subscription?

eck One ☐ Yes ☐ No

qualify fill out and return this form without delay. s information is needed for circulation verification d general marketing profiles. Your cooperation is preciated.

e..... Title.....

hon or Co.....

et.....

State Zip

Signature is required _____

_____

NOTE: To continue receiving your free subscription, complete this form ONLY if:

(1) You have not previously done so within the current calendar year.

OR

(2) Your job situation, title, or address has changed.

You need to complete this form only ONCE A YEAR to remain on the subscription list.

If this is an address change, affix label

Is this your business address? ☐ Yes ☐ No

If not, please give us your business address below so that we can avoid sending duplicate copies

Name.....

Station or Co.....

Street.....

City..... State..... Zip.....

TO QUALIFY, PLEASE COMPLETE THE FOLLOWING:

se check your PRIMARY ness classification

ck one only):

V & AM & FM Station
V & AM STATION
V & FM Station
M & FM Radio Station
M Radio Station
M Radio Station
V Station, Commercial
V Station, Educational
ampus limited Radio Station
ATV with studio facility
FS Microwave
ecording Studio
eleproduction Facility, Film
eleproduction Facility, Video
onsulting Firm (Engineering or Technical)
overnment Agency
ealer or Distributor of Broadcast Equipment
CTV *(If you check this category, please answer details listed in 1(b) below.)*

ther: Specify_____

). Check your CCTV Applications:

usiness or Commercial
or personnel & sales training)
ndustrial (for monitoring
roduction & control applications)
ecurity (surveillance)
ducational or Instructional
academic or vocational institutions)
Medical/Hospital
Other: specify _____

2. Check the category that best describes your title.

☐ **Corporate Management.** This includes Board Chairman, President, Owner, Partner other corporate management title, administrative official or corporate director, general manager (administration).

☐ **Technical Management & Engineering.** This includes technical director, chief engineer, engineering supervisor or director engineer/technician or other engineering and technical job responsibilities

☐ **Operations Management.** This includes station manager, production manager, program manager, general manager of operations (not administrative).

☐ Other: Specify_____

3. Does your occupational responsibility extend to more than one station or facility?

Yes ☐ No ☐

4. If none of the foregoing businesses or occupational categories fits your situations, please describe specifically your occupation or interest in BROADCAST ENGINEERING magazine: _____

5(a). Check the statement that best describes your role in the purchase of major communications equipment, components and accessories:

Make final decision to buy a specific make or model
Recommend make or model to be purchased
Have no part in specifying or buying

5(b). Is specifying and buying major equipment, components and accessories a group or committee activity in your facility?

Yes ☐ No ☐

5(c). If the response to the foregoing question is yes, indicate whether you are an active member of the committee or group.

Yes ☐ No. ☐

THANK YOU, NOW PLEASE FOLD, SEAL AND MAIL.

PLACE
FIRST CLASS
POSTAGE
HERE

BROADCAST ENGINEERING
P.O. BOX 12901
OVERLAND PARK, KANSAS 66212

Attn: Evelyn Rogers

Just fold, seal with tape, and mail - please **do not staple**...Post Office will not deliver.

BROADCAST ENGINEERING

BROADCAST ENGINEERING is directed to key persons actively involved in planning, managing, and operating broadcast facilities, recording studios, studio originating cable TV and non-commercial systems.

You are required to renew your free subscription periodically and this subscription verification form is provided for your convenience in doing so. You must fill in all appropriate spaces, date and sign this card in order to start or renew your subscription.

First in a new advanced class of digital processors!

The DPS-1 by Digital Video Systems.

The DPS-1 is the new third generation Time Base Corrector conceived to operate at standards significantly higher than those previously adopted by the television industry, and born through years of dedicated research by a team of experts.

This all-digital processing system, using computer circuitry operating at four times subcarrier, adapts its parameters automatically to incoming video feeds as input sources are changed.

Features include a super-wide 32 line window, digital test signal generator, microprocessor control, digital burst processing, and a full range of circuit board options to satisfy all operating requirements, including Frame Store.

The DPS-1 offers substantially improved production capability to both broadcasters and industrial producers. Authorized dealer and customer service representatives, strategically located throughout the United States and Canada, will be happy to demonstrate the versatility of this new advanced system to you.

Ask us for full details.

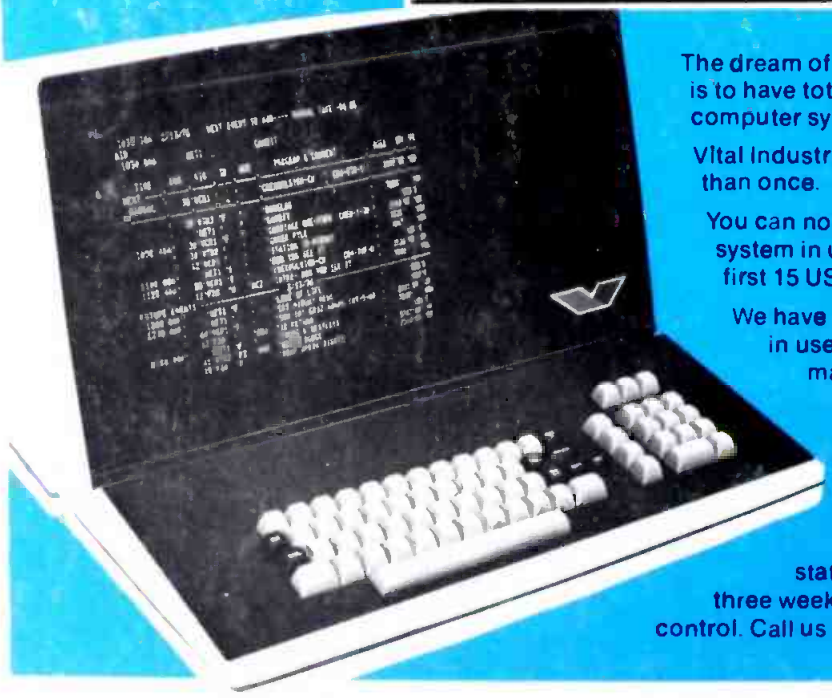
digital video systems

DIGITAL VIDEO SYSTEMS, 519 McNicoll Avenue, Willowdale, Ontario, Canada M2H 2C9

Telephone: (416) 499-4826

For More Details Circle (1) on Reply Card

THE VITAL BUSINESS CONNECTION MAKES TV AUTOMATION TOTAL = VIMAX-200



The dream of every TV broadcast station management is to have total automation married with a business computer system with minimum interruptions.

Vital Industries, Inc. has done it, and done it more than once.

You can now see our actual total TV automation system in use in one of several TV stations in the first 15 US TV markets.

We have over 30 technical automation systems in use since 1972. This total experience makes it also possible for us to offer a building block approach of a 32 event preset system to stations as a first step towards total automation.

We have installed a complete automation system, connected it to a business service, and trained station personnel to operate it in less than three weeks. We've got total TV automation under control. Call us toll free. 1-800-874-4608

VITAL INDUSTRIES, INC.
A HIGH TECHNOLOGY COMPANY

MAIN OFFICE: 3700 N.E. 53rd Ave., Gainesville, Fla. 32601 • Phone 904/378-1581

MORRELL BEAVERS Midwest
2644 North Seventh St.
Terre Haute, Indiana 47804
Phone 812/466-3212

ROBERT McALL Northeast
34 Autumn Lane
Hicksville, N.Y. 11801
Phone 516/735-0055

GORDON PETERS Southwest
P. O. Box 912
Arlington, Texas 76010
Phone 817/261-6855

ERIC KING Southeast
Fox Hill Road
Lynchburg, Va. 24503
Phone 804/384-7001

BARRY HOLLAND West C
7960 West Beverly Blv
Los Angeles, California 9
Phone 213/653-9438

For More Details Circle (2) on Reply Card