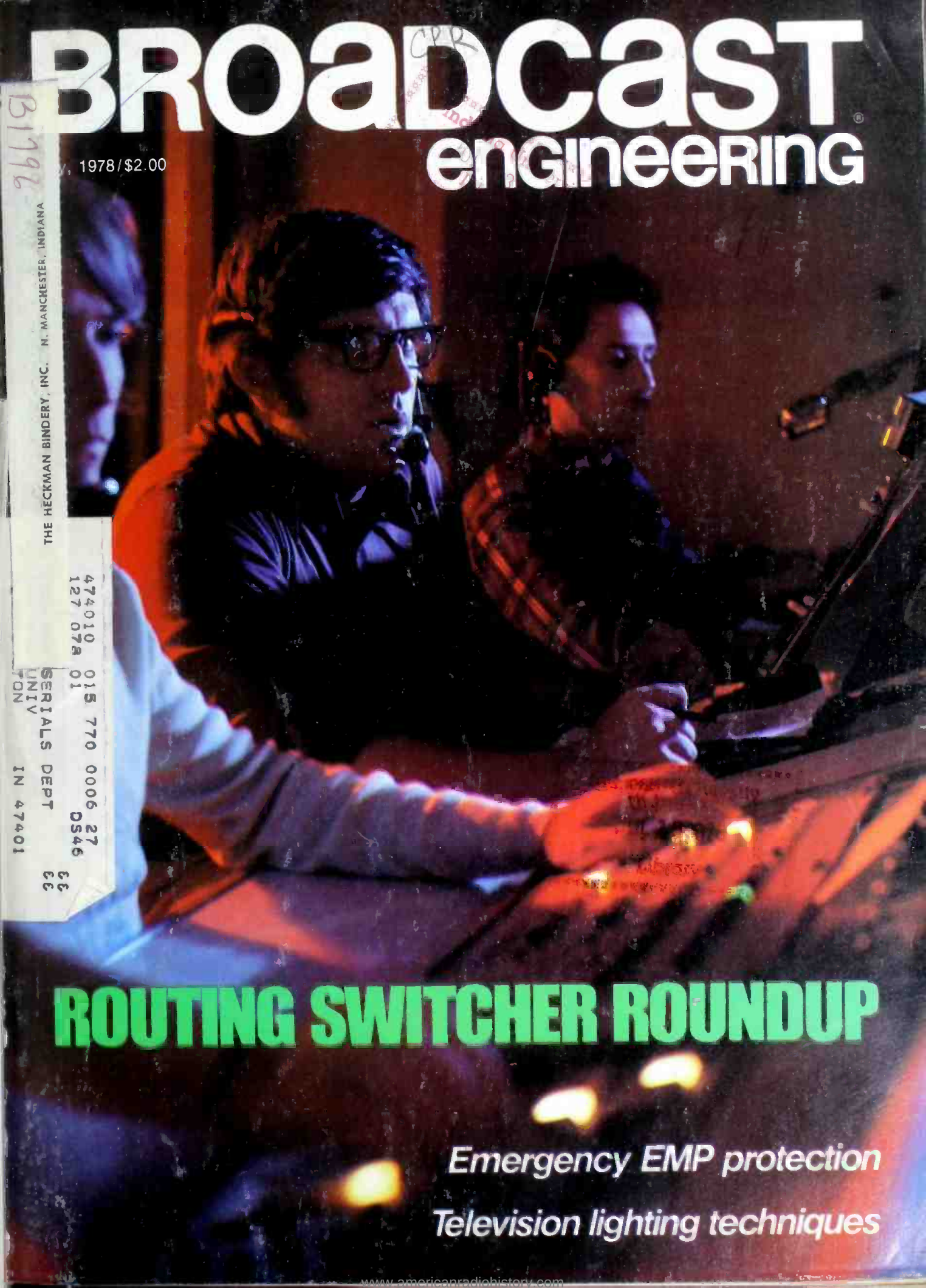
BROADCAST engineering

, 1978/$2.00



ROUTING SWITCHER ROUNDUP

Emergency EMP protection

Television lighting techniques

Ward-Beck introduces affordable quality!

Advanced Ward-Beck technology has developed circuitry in the new WBS 470 Series that's exactly right for broadcasters seeking superior performance at a competitive price.

The standard model L3242 includes such outstanding features as full equalization, individual peak indicators on each input channel, HL line selectors, integral jackfield and redundant power supply changeover. In addition, expanded flexibility is achieved through an impressive selection of optional ancillary modules.

Standardized assembly methods have reduced production time and expense, while traditionally impeccable Ward-Beck engineering and styling have been enhanced.

Now, we can supply most orders from stock. And you can afford to move up to Ward-Beck quality.

WBS

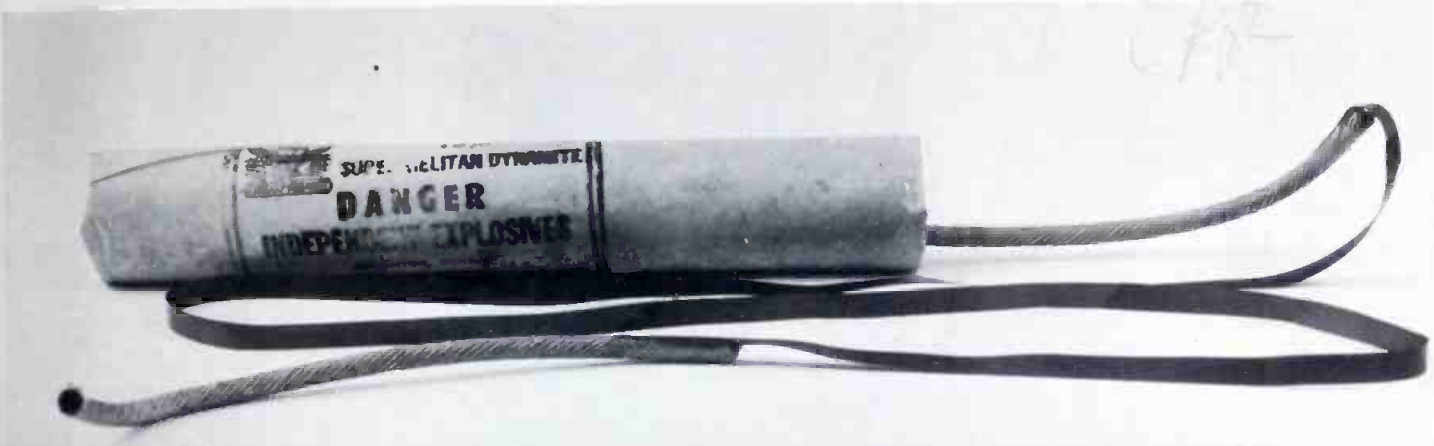
First by Design.

Standard TV Production Console
(32 x 4 x 2 configuration)
WBS Model L3242

Ward-Beck Systems Limited, 841 Progress Avenue, Scarborough, Ontario, Canada M1H 2X4.
Tel: (416) 438-6550.

Ward-Beck Systems Inc., 6900 East Camelback Road, Suite 1010, Scottsdale, Arizona 85251.

Talk shows can be dynamite!



(The risk is less with our 4 foot fuse.)

The RP Delay, a four-function tape cartridge machine: normal cartridge recording and playback, plus network and continuous program delay. And that delay feature provides lots of low-cost insurance: against liable suits, FCC actions, alienated advertisers and audiences.

Just insert an erased cartridge. A seven second tape (about 4 feet) for talk shows. Five minutes or longer to record a network program. Our three-head, dual playback amplifier assures no audio compromises. Four functions for little more than the price of two.

CALL TOLL-FREE
800-447-0414

From Illinois, Alaska or Hawaii call collect: (309) 828-1381. Ask about our no-risk 30-day trial offer. Attractive lease-purchase plans available. Generous trade-in allowances. Standard two year warranty.

INTERNATIONAL TAPETRONICS CORPORATION
Bloomington, Illinois 61701

Circle (2) on Reply Card

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

July, 1978 ☐ Volume 20 ☐ No. 7

BROADCAST engineering

The journal of the broadcast communications industry

Contents

page 32

About the cover

This month's cover depicts the use of routing switchers, the subject of a special two-part roundup. Part 1 of the Routing Switcher Roundup begins on page 24. Part 2 will appear next month. (*Photo by Ron Whittaker.*)

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.

ABP
Member, American Business Press

BPA
Member, Business Publications Audit of Circulation

EDITORIAL
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*
Hillary Manes, *Editorial Assistant*
Dudley Rose, *Art Director*

CIRCULATION
John C. Arnst, Director
Evelyn Rogers, Manager

ADMINISTRATION
George H. Seferovich, President
George Laughead, 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 CORP.

FS-15 Frame Synchronizer by

NEC

An Emmy Award went to NEC's famous FS-12. . .and now this award-winning expertise has produced the FS-15!

And only the FS-15 combined with a Grass Valley Group 1600-Series switcher gives you the basis for a complete NTSC Digital Video Effects (DVE) system. One you can build a piece at a time with exactly matched components.

Exciting stop motion effects with the Freeze frame option for the FS-15 are a first modular step. . .at modest cost. Then add the NEC TBC and Velocity Corrector/Dropout Compensator to synchronize signals from your ENG cameras or helical scan video recorders. And later an NEC DVP-15 interfaced with your GVG Series-1600 switcher completes your DVE system. . .whenever you're ready for it. Production effects the equal of many expensive optical/film techniques are then at your fingertips in your own production or control room.

Your nearest Grass Valley Group field office can detail how our 1600-Series switchers, with the NEC FS-15 and its options, can enhance your productions.

Distributed exclusively in the US by

OFFICES:

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

1644 Tullie Cir, NE
ATLANTA, GA 30329
(404) 321-4318

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

2639 Walnut Hill Ln, Ste143
DALLAS, TX 75229
(214) 358-4229

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

THE GRASS VALLEY GROUP, INC.

A Tektronix Company

DIRECT CURRENT FROM D.C.

July, 1978/By Howard T. Head and Harold L. Kassens

House proposes new Communications Act

The House of Representatives Subcommittee on Communications has reported out a new "Communications Act of 1978" which would replace the present 1934 Act. The new legislation would make sweeping changes in all aspects of telecommunications regulation. Of particular interest to broadcasters are:

- The FCC would be abolished, to be replaced by a Communications Regulatory Commission (CRC). The new commission would be composed of five commissioners, each having a single term of 10 years.

- A National Telecommunications Agency (NTA) would be set up as an independent policy arm of the executive branch, replacing the new Commerce Department National Telecommunications and Information Administration (NTIA) which has just replaced the old White House Office of Telecommunications Policy (OTP).

- Radio broadcasting would be completely deregulated, with licenses for indefinite terms.

- Television license terms would be extended from three to five years, the terms to become indefinite after 10 years.

- Federal regulation of cable television would be prohibited.

New educational FM broadcast rules

The commission has issued an order making extensive changes in the rules governing non-commercial educational FM broadcast stations. These actions were taken in response to a petition by the Corporation for Public Broadcasting (CPB).

Low-power Class D (10-Watt transmitter output) stations are required to increase their power to at least 100 Watts or to move to new commercial frequencies. The operation of 10-Watt Class D stations will be permitted in the commercial portion of the FM band only on a non-interference basis.

continued on page 6

INSTANTANEOUS Digital Command

30 Functions for only $1995

TFT Model 7601 represents a major breakthrough in remote control systems. Now, you can get 20 channels of digital command functions plus 10 channels of digital telemetry functions for less than $2000! And it's the same high quality, reliable design that has made TFT equipment a standard in the broadcast industry. Just check this line-up of features:

DATA SECURITY ASSURED
Full command-code redundancy, *plus* odd/even parity check, makes digital data errors virtually impossible. A TFT proprietary feature. Even lightning induced noise has no effect on integrity of command functions.

INSTANTANEOUS COMMAND
Less than 0.2 second marks the time for a complete command/execute function with the new TFT high speed data modem.

ONE MAN CALIBRATION
The front panel of the Model 7601R (Remote Terminal) has a DVM and scaling potentiometers so that just one man, on-site, can perform the FCC required weekly calibration. A studio lock-out switch provides complete operator safety for on-site work.

CHOICE OF TRANSMISSION METHODS
Model 7601 interconnection can be either telephone 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 disconnecting 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 systems 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 tolerance alarm system, and a complete line of remote control accessories. They're all available now from TFT. Call or write:

*Trademark pending

TFT TIME & FREQUENCY TECHNOLOGY INC.
3090 OAKMEAD VILLAGE DRIVE, SANTA CLARA, CA 95051 (408) 246-6365 TWX No. 910-338-0584

Circle (3) on Reply Card

DIRECT CURRENT FROM D. C.

continued from page 4

A new Channel 200 (87.9 MHz) is established, upon which non-commercial operation with power not in excess of 50 kW ERP at 100 feet will be permitted subject to non-interference to the reception of television Channel 6 (82-88 MHz). A freeze is imposed on applications for further Class D stations.

Comments are invited on the establishment of a Table of Assignments for non-commercial FM stations. This table would be similar to the Table of Commercial Assignments now contained in Section 73.202 of the commission's rules, except that several new classes of non-commercial FM station would be established.

Lower noise figure ordered for UHF television receivers

The commission has ordered a reduction in the maximum permissible noise figure for UHF television receivers, from the present value of 18 dB above $kT\Delta f$ to 14 dB. The lower figure is to be effective on all models submitted for certification after October 1, 1979; by October 1, 1981, all new television sets must satisfy this requirement.

A further reduction -- to 12 dB -- is to become effective on October 1, 1982. In addition, the commission plans to initiate several new proceedings involving consumer labeling, noise figure measurement, and interference rejection. These measures were taken in response to a petition by the Council for UHF Broadcasting (CUB).

Short circuits

The commission has instituted an inquiry into the communications needs of the deaf: phone TTY 202-632-6999...The commission has informed the Senate Communications Subcommittee that it has no objection to "Goldwater-Vanik" legislation giving the commission authority to require RF interference rejection in consumer electronics devices...The commission has required an Alabama FM grantee to accept responsibility for any interference to a nearby cable-TV head-end...The commission has permitted several cable systems to use frequencies in conflict with those being used by nearby (111 km) aeronautical radio stations...How the commission spends its time: It took the commission a three-page letter to explain to a complainant why NBC should not provide "equal time" to debate the theological reality of Noah's Ark...An unlicensed FM broadcast operation has been shut down in southern Florida...The commission has told the State of Washington that it can't use "drone radars" which would trigger speed radar detectors; this makes the commission an inscrutable, mysterious, and repetitious fubujaki (fuzz-buster-jammer-killer).

now you can afford to think BIG!

The 3900 Series Switching System utilizes advanced microprocessor technology for cost-effective multi-level distribution of audio, video, and high-speed digital information.

FEATURES:

- Typically 400 crosspoints per unit
- Up to five discrete levels of switching
- Modular expandability
- Clamped or DC restored inputs
- SMPTE time-code compatibility
- Two-wire control
- X-Y status polling
- AFV or separate audio/video/wide-band channel control
- Multi-sourced components, no custom hybrids

For more than 10 years, American Data has been respected as the industry leader in innovative switcher design. We have the experience and flexibility to satisfy your requirement, large or small. Call us!

American Data™

Research Park • P.O. Box 5228 • Huntsville, Alabama 35805 • Telephone 205 837-5180 • TWX 810 726-2125

ADC NORTHEAST
Box 452
New Hartford, CT 06057
(203) 379-7840

ADC MID-ATLANTIC
5504 Waterway
Rockville, MD 20853
(301) 460-1454

ADC SOUTHEAST
2219 Dakawana Rd., N.E.
Atlanta, GA 30345
(404) 633-2100

ADC MIDWEST
P.O. Box 27324
Indianapolis, IN 46227
(317) 784-3000

ADC WEST
3760 Cahuenga Blvd.
North Hollywood, CA 91604
(213) 760-3221

ADC NORTHWEST
P.O. Box 23
Mercer Island, WA 98040
(206) 232-3550

A North American Philips Company

industry news

NAB reacts to FCC proposals

Children's advertising

The banning of advertising in children's programs continues to be a controversial topic (see page 24, June **Broadcast Engineering**), as the National Association of Broadcasters takes on the Action for Children's Television (ACT).

The controversy concerns ACT's recent request that the FCC re-examine its 1974 report on broadcasters' responsibilities for children's television programming and advertising.

The report did not issue specific rules, but did outline expected performance and left actual implementation to the industry. The FCC's position later was upheld by the U.S. Court of Appeals for the District of Columbia.

ACT is seeking to eliminate advertising in children's programming, to establish rules or quotas for such programs, and to redefine children's programming to include those viewed by, as well as those designed for children.

However, ACT's request to re-examine the 1974 report is "unwarranted and inappropriate," according to the NAB. The association feels ACT has not succeeded in documenting the insufficiency of industry observance of FCC policy. In fact, the NAB said that the industry has lived up to the FCC expectations through the Television Code and voluntary self-regulation.

The NAB said ACT "offers no new data favoring its proposal to eliminate commercials from children's television. Nor does it suggest how children's programming is to continue, let alone expand, without visible means for support. In sum, ACT offers no basis in law or in fact for overturning current policy."

Advertising in children's programs also was addressed at the Children's Television Programming Conference held recently in Washington, D.C.

Speaking before the opening session, Kathryn Broman, president of the Springfield Television Broadcasting Corp. and conference chairperson, said that contrary to many critics' opinions "broadcasters are making a conscientious effort through self-regulation to meet their responsibilities" in children's television programming.

Broman, who is chairperson of the NAB's television board of directors, criticized recent moves by the Federal Trade Commission and consumer groups to ban advertising from children's programs. She also cautioned that the FCC may be moving in the same direction.

CATV program duplication

Another area of continuing concern for the NAB is regulation of cable television systems. Up to now, the FCC has afforded broadcasters some protection from CATV infringement; however, in a recent decision, the FCC said cable television systems can duplicate network programs already provided by local stations.

The NAB has asked the commission not to implement this decision, pointing out the serious economic impact on local stations that will result if cable television can bring in programs from distant points to compete with local commercial programming.

The association said that while it recognizes some adjustment of the network non-duplication rules might be appropriate in a few cases, it "consistently has opposed the sort of wholesale dismantling" of the protection priorities the FCC has adopted. The NAB accused the commission of using "a meat cleaver where micro-surgery was called for."

Operation during temporary malfunctions

The NAB is supporting a proposed change to allow radio and television stations to continue on-the-air operation during temporary remote-control malfunction.

According to NAB statistics, more than 80% of all AM and FM stations are authorized to operate by remote control. A majority of these stations use interconnecting wirelines, usually common telephone circuits

continued on page 10

Today's performance requires the best in an audio test source. That's the new Sound Tech 1410A.

No question about it, the new Sound Tech 1410A is the finest audio test source available. It provides both sine wave (10 Hz - 110 kHz) and SMPTE intermodulation test outputs.

We classify it as an ultra-high-performance audio signal generator. Here's why:

Besides providing an ultra-pure test signal (typical distortion is **less than** .001% over most of audio range), the test signal is adjustable by precision output attenuators. And you have an exceptionally large output level range: from +26 dBm to −89.9 dBm in 0.1 dB steps. That +26 dBm can be a powerful help in line testing (no pun intended).

The output system on the 1410A is Sound Tech's special circuit. For minimum distortion, it has no output transformer, yet **it's both fully isolated and balanced.** That means **you can connect to any load: balanced or unbalanced, floating or grounded.**

INTERMODULATION TESTING

For intermodulation measurements, the 1410A provides the standard 60 Hz signal combined with a 7 kHz signal. You can vary the LF/HF ratio over a 100:1 range. The IM signal is provided from the same flexible output system discussed earlier.

With the high performance possible in today's audio systems, the 1410A (or its relative, the 1710 system) is what's needed for adequate testing.

CALL FOR DATA

Call Mike Hogue/Larry Maguire and get our literature on the industry's most advanced audio test source.

They can also arrange a demo for you almost instantly.

REMOTE TESTING

In broadcast work involving remote transmitters, you can test by using the 1410A with the Sound Tech 1710A Distortion Measurement System. With its ½ watt of audio power, the 1410A can be used, say, at the studio to test studio-transmitter links, amplifiers, etc., while the 1710A is measuring at the transmitter.

SOUND TECHNOLOGY

1400 DELL AVENUE
CAMPBELL, CALIFORNIA 95008
(408) 378-6540
In Don Mills, Ont., Canada: The Pringle Group

Circle (5) on Reply Card

continued from page 8

either above or below the ground. And, the NAB stressed that it is not unusual for these lines to be temporarily disconnected. However, the NAB said, even with these interruptions the station's basic transmitting equipment continues to operate.

Because these temporary breakdowns are beyond the control of the licensee and are usually temporary, the NAB wants the FCC to permit stations to operate for one hour following the malfunction while repairs are made.

Candidate qualifications

The association also is supporting the FCC's efforts to establish a workable definition of a legally qualified candidate for public office.

In its comments, the NAB said clarification will aid broadcasters in determining obligations under the Communications Act and benefit candidates by spelling out conditions for air time.

Being opposed by the NAB, however, is the FCC's proposal which would make presidential and vice presidential contenders who qualify in one jurisdiction entitled to national recognition. The association stated that "these localized political activities are important, but they should not entitle the candidate to automatic nationwide status."

The NAB also wants the FCC to outline the precise requirements that non-presidential candidates seeking nomination by convention or caucus must make for a substantial showing of bona fide candidacy. For the candidate, the NAB said, "the particulars of the campaign and preferred strategy may be hampered by the need to pursue FCC-ordained activities" and broadcasters also may feel unduly limited by such rules.

FCC studying common use of TV towers

The FCC has begun an inquiry on the common use of TV towers by UHF and VHF stations.

The inquiry is in response to a request by Triangle Telecasters Inc. that the commission amend Section 73.635 of the rules to require that construction permits for new or changed facilities for VHF stations that involved building or modifying a tower be conditioned to permit UHF's, upon request, to put their antennas on that tower.

(Section 73.635 states that no TV license or renewal will be granted to any person who owns, leases or controls a site suitable for TV broadcast in a particular area if [a] the site is not available to other licensees; [b] no other comparable site is available in the area; and [c] where the exclusive use of the site by the applicant or licensee would unduly limit the number of TV stations that could be authorized in that area or would unduly restrict competition among TV stations.)

Triangle proposed that the UHF station pay for any tower alteration necessary to support its antenna through rental fees or a contribution to the construction costs.

Triangle, which had been a UHF-TV licensee in the past and said it hoped to acquire additional UHF's in the future, contended that its proposal would bring UHF and VHF more nearly into parity, would lower the cost of improving the facilities of a UHF station, and might lead to activating unused UHF assignments. It also said there would be environmental and other benefits (i.e., fewer towers to clutter the landscape and possibly constitute air hazard problems).

continued on page 12

Introducing the SPG 130N... a new design approach in digital Source Sync Generators with ten times better horizontal resolution. A perfect companion to the SPG 102N N.T.S.C. Master Generator.

LEITCH

Progressive Concepts in Television Technology

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

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

Circle (7) on Reply Card

continued from page 10

Although it was not fully persuaded that Triangle had made a case for incorporating its specific language in the rules, the commission said the proposal appeared to warrant further investigation.

Of particular interest are possible time limits on making space available; restrictions on new facilities; limiting the benefits to UHF TV stations; and impact on the use of the tower to mount other antennas, including microwave receiving antennas used for studio-transmitter links or a television pickup station.

Missouri, Kansas broadcasters meet

Missouri and Kansas broadcasters held their first joint convention June 8-11 at the Airport-Marriott Hotel in Kansas City, Missouri.

Topics at the convention included sale and employee motivation, children's advertising, radio sales, and the future of broadcasting. Also making an appearance was FCC chairman Charles Ferris.

The event began with a family-oriented cocktail party and gala barbeque on June 8, sponsored by Lenco Inc.'s electronics division. Lenco, based in Jackson, Missouri, manufactures the 300 System, which they call the most versatile pulse distribution system ever offered the professional broadcaster.

ADDA's VW-1 goes to Cox Broadcasting

The first quantity sale of ADDA's VW-1 frame synchronizer, first introduced at NAB '78, has been made to Cox Broadcasting of Miami.

The VW-1 is a fourth harmonic, digital synchronizer with TBC and freeze frame capabilities. The price for the system is $19,700; a remote-control console is optional for $1,500.

NEC America announces sale

WMAQ-TV, Chicago's NBC affiliate, has purchased NEC's model TKA-105 routing switcher. The announcement was made by R. Dennis Fraser, vice president and general manager of NEC America's broadcast equipment division.

The 75-input by 90-output switcher will initially incorporate three discrete digital audio channels, with the capability of expanding to four; it will cost close to $1 million. The switcher employs a NTC 7 VITS signal.

WMAQ-TV's purchase follows an earlier sale to NBC's Burbank studio of a 150-input by 270-output routing switcher, the largest ever placed in commercial television service.

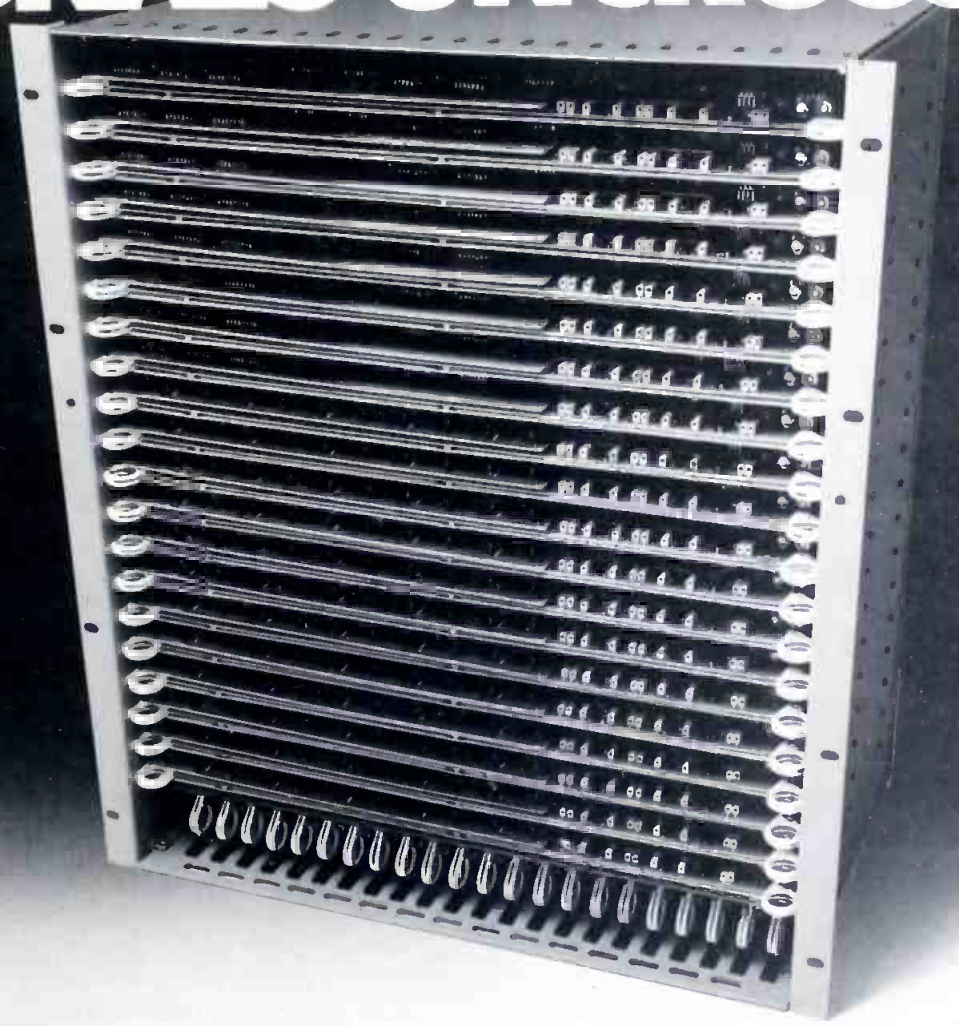
FCC approves exchange of stations

The Evening News Association (ENA) has swapped its station WWJ-TV, Detroit, with station WTOP-TV, Washington, owned by the Post-Newsweek Stations, Capital Area Inc.

The exchange, recently approved by the FCC, permits Post-Newsweek to upgrade its top-50 market status by exchanging its Washington station (eighth market) for a Detroit station (seventh market). Therefore, the action is subject to the FCC's policy prohibiting the common ownership in the top-50 television markets of more than three stations or more than two VHF's unless the applicant submits a "compelling public interest showing" to demon-

continued on page 14

GET YOUR SIGNALS UNCROSSED.



No matter how complicated your studio operation is, we can unsnarl your signals and send them on their way, with one of our nine off-the-shelf Switcher series.

For example, many broadcasters use our lower cost 15X or RX Series Switchers to switch input signals to their VTR machines. By providing instant access to signals at the touch of a button, difficult editing jobs are accomplished on the spot and, during the Vertical Interval.

And to minimize system downtime we've designed our Series 20X and 40X Switchers for optimum reliability and capability. Most units have a microprocessor in every channel to eliminate total system failure if the logic system malfunctions. And you can replace a channel module without shutting down the entire system.

For audio use, our solid-state Series AX Switchers make the old fashioned patch panel a thing of the past.

All 3M Routing Switchers can be built to nearly any input/output capability, with vertical interval switching and can be operated by many types of controls.

Studio operation is getting more complex every day. You can't fight it, so why not switch? Switch to 3M Routing Systems.

Circle the reader service card number at the back of the book for more information or call 205-883-7370 for system design assistance. 3M Video Systems. Watch us in action.

3M COMPANY

Circle (9) on Reply Card

continued from page 12

strate that the benefits would outweigh the detriment to the policy of media diversity.

In its arguments for the exchange, Post-Newsweek said the swap of stations would eliminate local newspaper-television cross-ownership in two major cities—*The Washington Post* and WTOP-TV in Washington and *The Detroit News* and WWJ-TV in Detroit. In effect, this exchange was a voluntary implementation of the FCC's policy to encourage local media diversity through separate ownership of television stations and newspapers in the same market.

New method of radio transmission

A patent on a basic principle for adding FM channels and AM frequencies is being applied for by John Grinnan, owner of Grinnan Fixture Company of Minerva, Ohio.

In his method, Grinnan proposes that speech be changed to bits of information and then fed to the transmitter.

"These would not necessarily be digital bits," Grinnan said, "as they might have undesirable features. It is known that bits of information can be transmitted at extremely high speeds. These bits of information could be transmitted on extremely narrow bandwidths on both the AM and FM bands, possibly 1 kHz wide, which would open up thousands of new channels."

According to Grinnan, present transmitters could be used with only slight and comparatively inexpensive alterations; additional speech equipment would have to be added.

"It is considered possible that inexpensive converters could be made for present-day receivers to convert the bits back into speech," he said.

Grinnan admits that this system must be perfected, which may take a long time; however, he feels that once the system is ready for implementation it will have a ready market in television.

Auditronics centralizes operation

Auditronics Inc. recently moved its entire operation into a single new facility in Memphis, Tennessee. The company, manufacturers of audio consoles, previously had been spread among multiple locations, with headquarters in Weston, Mass. The new two-story plant doubles Auditronics square footage, as well as puts the engineering, manufacturing, and administrative departments under one roof.

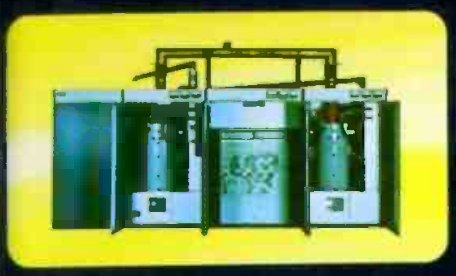
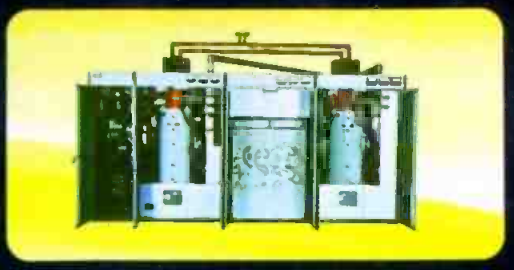
Station-buying booklet available

Anyone interested in purchasing a broadcast station now can obtain a booklet dealing with how to go about it.

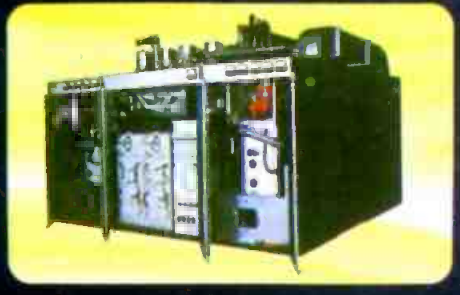
The booklet, "Purchasing A Broadcast Station: A Buyer's Guide," is available from the NAB. The 46-page booklet contains essential information about evaluating the worth of a station, financing the purchase, and the importance of obtaining expert advice. It also discusses how to obtain FCC approval and how to prepare the FCC application.

The first copy of the booklet is available free to NAB members. It costs $3.00 for additional copies for members and $3.00 per copy to all others to cover printing and postage.

Send a check or money order to Legal Department, NAB, 1771 N Street, N.W., Washington, D.C. 20036. □






20 more reasons to buy your next transmitter from

NEC

Nippon Electric Co., Ltd.
Tokyo, Japan



Call 800-323-6656/In Illinois (312) 640-3792

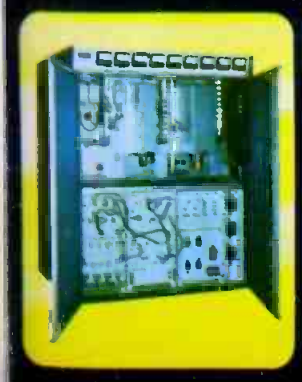
NEC America, Inc.

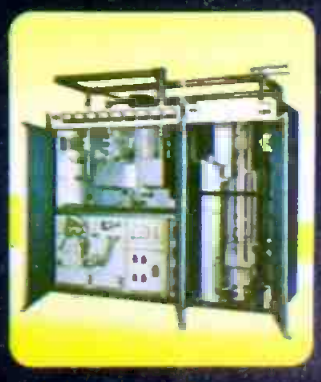
Broadcast Equipment Division
130 Martin Lane, Elk Grove, Village, Illinois 60007

Circle (13) on Reply Card






people in the news

Manufacturers/Distributors

Four appointments were announced recently by McMartin Industries. **Eric Somers** joined the company as advertising manager. Somers was formerly vice president and creative director for Griffith and Somers Advertising, Omaha and Sioux City. **Charles B. Patterson** is the new manager of international sales. He has worked as a broadcast engineer and as sales manager for Harris Corporation. **Robert Schneider** and **Robert Beattie** were appointed district sales managers. Schneider will be responsible for the upper Midwest; Beattie will work in the South Central region.

New marketing director at Neve Electronics International Ltd., formerly called Rupert Neve & Co. Ltd., is **Derek Tilsley. Jonathan Pedre** joins the board as marketing director responsible for Neve's United Kingdom and worldwide activities apart from North America where a Neve subsidiary already operates.

Martin Plost has been appointed product marketing manager for satellite video receiving terminals for Hughes Aircraft Company's microwave communications products. Plost formerly was manager of market planning and analysis at Hughes' microelectronic products division.

At Belden Corp., **Clyde J. Schultz** assumed the position of director, special market development. Schultz will be responsible for establishing a program for development, production, and marketing of new products in electronic systems and peripheral equipment.

PLOST

SCHULTZ

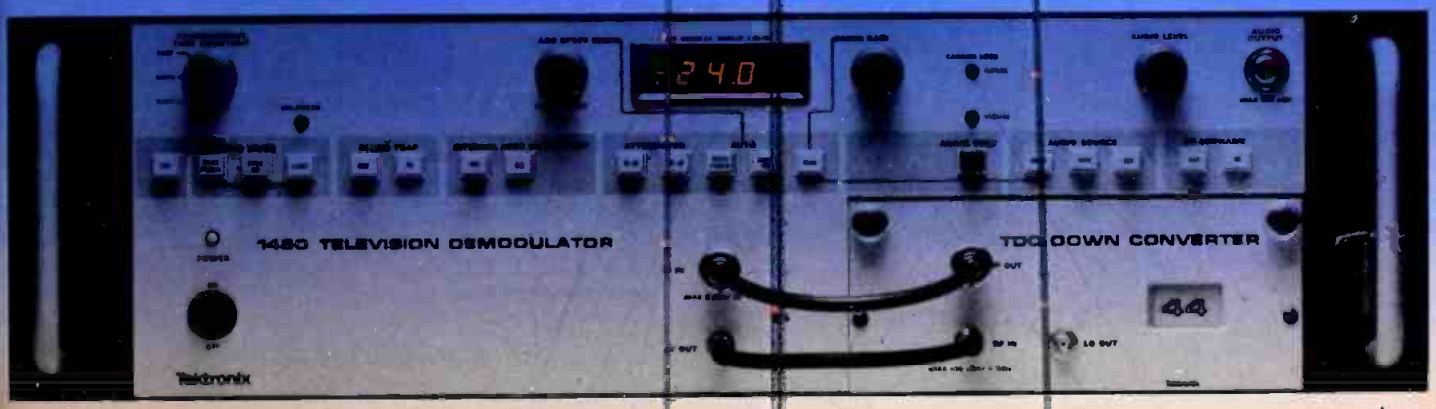
VRIGNAUD

Catel, a division of United Scientific Corp., named **Gilles Vrignaud** as product manager. For the past six years, Vrignaud has served as product and engineering manager for Welsh Communications, Catel's Canadian distributor.

As manager, Meadow Lands Broadcast Engineering, for RCA Broadcast Systems, **Richard Rocamora** will be responsible for the engineering design and development of the company's line of AM and FM radio and TV broadcast transmitters and audio products.

continued on page 18

Clearly the Best.



1450–The Transparent Demodulator

One thing is crystal clear. You can't buy a better television demodulator than the TEKTRONIX 1450 System M Demod. Why? Because it's "transparent." The 1450 allows signals to pass through for inspection without altering their characteristics. In other words, if you use a 1450, you'll get the true picture of your transmitter's output.

You'll want to use the 1450 for other reasons, too.

Save time (and money) on transmitter alignment

- Synchronous detection eliminates confusing quadrature distortion.
- Precise bandpass characteristic and linear detector plus flat IF and video response give faithful signal reproduction.
- Split carrier sound detection speeds troubleshooting and alignment of the aural transmitter because no vision carrier is required.

Reduce equipment maintenance costs

- S.A.W. filter IF strip requires no adjustment; extends time between normal periodic recalibrations.

Improve your program sound

- Synchronous detection and dual video detectors operating in phase quadrature facilitate measurement of the incidental phase modulation of the vision carrier that appears as noise in the received sound.

You can use the 1450 anywhere — at the transmitter or off-air at a remote site — without attenuators or external amplifiers.

If you think there's a problem with the performance of your transmitter or antenna system but you're not sure, choose our 1450. The Transparent Demod will clear the air for accurate, reliable television transmission.

Call your nearest Tektronix Field Office and ask for a demonstration of our 1450 Television Demodulator. Or, for additional specifications, write Tektronix, Inc., P.O. Box 500, Beaverton, OR 97077

Tektronix
COMMITTED TO EXCELLENCE

For Technical Data Only Circle (11) On Reply Card
For Demonstration Only Circle (12) On Reply Card

people in the news

continued from page 16

Fisher-Burke Professional Audio of Phoenix, Arizona, announced the appointment of **Lex Rodgers** as president of engineering.

James R. Williams, a 12-year veteran in the audio industry, has joined Cetec Audio as quality-control manager. Prior to joining Cetec, Williams held various quality-control posts at RCA's record division.

In his new position as manager of systems engineering and custom repair and engineering shop for RCA Broadcast Systems, **Albert T. Montemuro** will be responsible for the RCA activity known as the CRAE shop. The CRAE shop equips custom-built TV vans used by broadcasters around the world, and designs and assembles entire TV broadcast studios. For the past eight years, Montemuro has been with RCA systems engineering group.

KLH's newly appointed executive vice president, **Bob Coppola**, has been put in charge of the marketing and sales of KLH and Burwen Research products both domestically and abroad. Coppola has represented the company in Europe for the last 10 years.

Radio/Television

As a consultant for long-range planning and development for the Maine Public Broadcasting Network (MPBN), **Donald V. Taverner** will utilize his experience in development of public broadcasting. Most recently he served as executive secretary of the Maine School Management Association. **Susan Tibbetts**, producer of several MPBN radio programs, has resigned; she plans to devote her time to a book she has started. Also, the executive producer for public affairs, **Jeanne Meserve**, was recently rehired by MPBN after it received a Corporation for Public Broadcasting Women's Training Grant to expand its public affairs offerings.

Reid A. Shaw, president of GE Broadcasting, has announced appointment of **A. Donovan Faust** as vice president and general manager of the company's radio and television stations in Nashville, Tennessee (WNGE, WSIX-AM/FM). Faust, who has been with GE Broadcasting since February 1966, succeeds **Brian E. Cobb**, now vice president and general manager of the company's radio and television stations in Denver, Colorado.

Bob Oxarart is the general manager of KUPL-AM in Portland, now an NBC affiliate.

Janet Thomas May joined the staff of WSFA-TV News, Montgomery, Alabama, as general assignments reporter. Since graduating from college in 1975, May has worked at several stations as a news anchor, news reporter, and public affairs director.

Little Rock radio station K-KYK announced the appointment of **Rusty Pekar** as advertising sales manager. Pekar, who joined the station in May 1976,

continued on page 22

when cost is more important than price

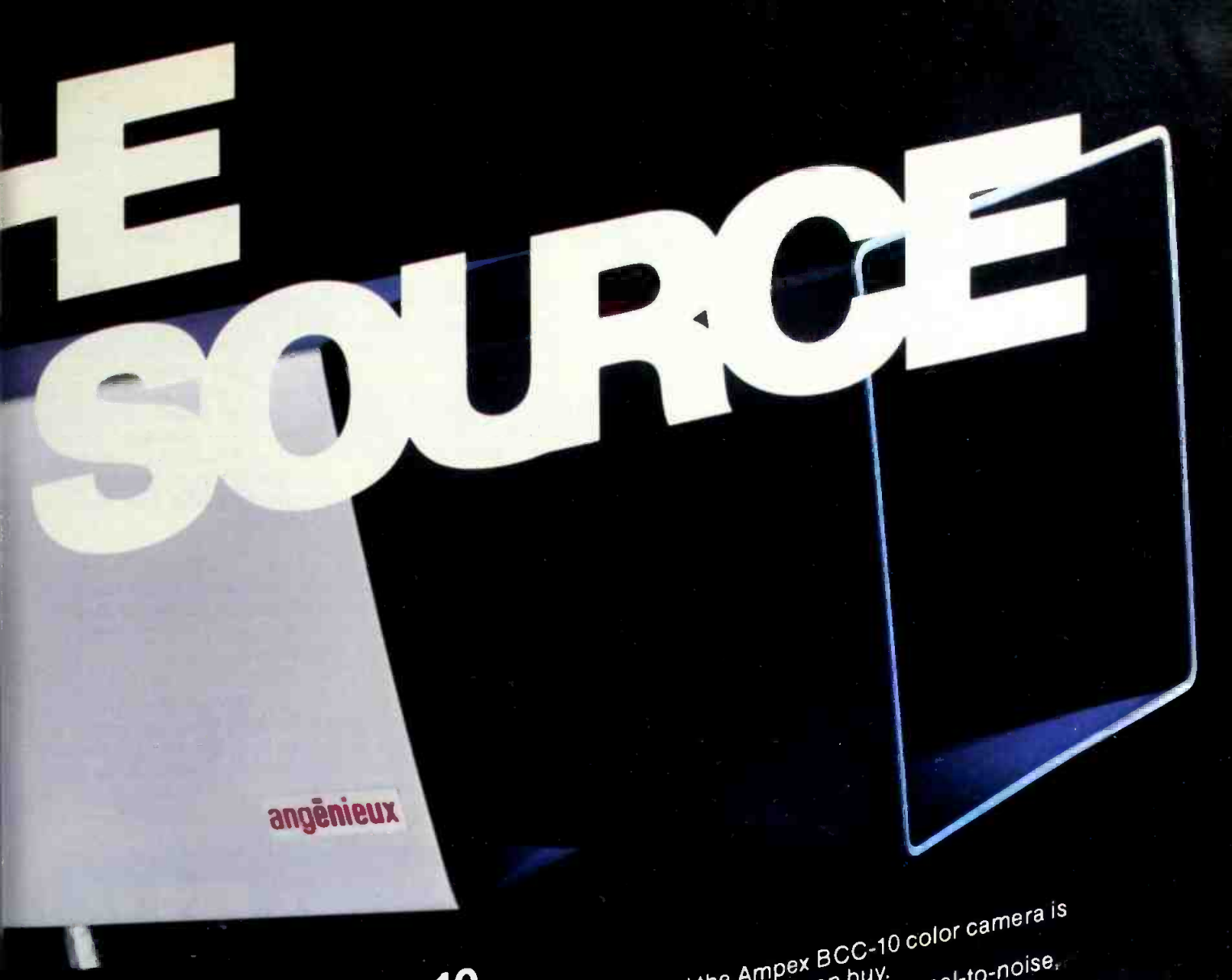
Value conscious broadcasters specify the Studer B67 because it outperforms its competitors on the really significant broadcaster criteria:

- Studer state-of-the-art quality
- Long service life with low failure rate
- Speed and ease of user maintenance

If you're more concerned with *total* cost than just initial price, write to us for complete information on the superiority of the Studer B67 Broadcast Recorder/Reproducer. We'll show you why it's your best tape recorder investment.

STUDER

Studer Revox America, Inc., 1819 Broadway, Nashville, Tenn. 37203 / (615) 329-9576 • In Canada: Studer Revox Canada, Ltd.



BCC-10

Television is a picture business, and the Ampex BCC-10 color camera is the source of the best video performance you can buy.

Measure video performance in terms of luminance signal-to-noise, and no other camera measures up to the BCC-10's 54 dB figure. Or measure performance in terms of modulation depth; BCC-10 wins again with 60% to 70% depth. The performance comes from a new generation of circuitry that employs the industry's most advanced video processing techniques.

Everything from color balance and centering to instant correction of critical picture adjustments is under automatic control. This is the camera (and CCU) that actually thinks ahead to minimize operator errors.

If you're using ACT tubes, the BCC-10 offers on-demand switching for longer tube life. And if you go to the newly developed diode gun tubes, the BCC-10 accepts them without modification. With either these or standard tubes, this is the camera that delivers the picture.

It all boils down to a single fact: BCC-10 is the only camera that'll let you capture the look you want. Ampex took the latest video recording technology and designed it into a studio camera that's a joy to operate.

Production begins right here. With the source. With the finest studio camera performance you can buy. The new BCC-10 from Ampex.

AMPEX MAKES IT EXCITING.

Ampex Corporation, 401 Broadway, Redwood City, California 94063 415/367-2011

Circle (69) on Reply Card

people in the news

continued from page 18

was previously sales manager with National Comp Associates, a member of Lone Star Life Insurance Company.

Recently appointed members of the NAB's International Committee include **Arch L. Madsen**, president, Bonneville International Corp., chairman; **Kathryn Broman**, president, Springfield (Mass.) Broadcasting Corp.; **William Hansen**, general manager, WJOL, Joliet, Ill.; **Wayne Kearl**, president, Harte-Hanks Television Group, San Antonio, Texas; and **Daniel Kops**, president, Kops-Monahan Communications Inc., New Haven, Conn. The International Committee was created to promote the free flow of news and information internationally.

Gary Peterson of KXXL Radio, Bozeman, Montana, has been elected to a three-year term on the board of the National Sportswriters and Sportscasters Association. Peterson has been Montana's Sportscaster of the Year for the past four years.

After two years as a receptionist for the Arkansas Radio Network, **Francoise Clay** was promoted to executive assistant. Clay has worked as a bilingual secretary in France, and teaches French in a local educational program. □

Last year, 42 U.S. broadcasters bought RCA TV transmitters, making us the Number One choice.

For more than one good reason.

The fact is, there are many good reasons for RCA transmitter popularity.

But there is one characteristic of RCA transmitters that everyone seems to agree on: RCA quality. Quality of design and construction. Quality that results in dependable performance year in, year out.

Quality that's become a tradition.

RCA transmitters are advanced—and free of gimmicks.

That is one good reason why an RCA transmitter is a lasting value.

It's state-of-the-art, yes—but always with concepts and construction that have been fully proved.

In an RCA transmitter, you'll find more solid state circuitry, more features that enhance over-all reliability. And fewer of the traditional transmitter troublemakers.

RCA service. Also advanced. And available 'round the clock.

We want you to be as pleased with your RCA transmitter years from now as you are when you first throw the switch. So we make RCA service all you could hope for.

For openers, there's a large, knowledgeable and dedicated staff of engineers and transmitter specialists at your service. If you need the answer to an operating question, or help with a technical problem, just call Tech Alert, (609) 338-3434, at any time, day or night.

If you need emergency parts for an RCA transmitter, they can be shipped same day, fastest way. Owners of RCA transmitters—especially older units—really appreciate this.

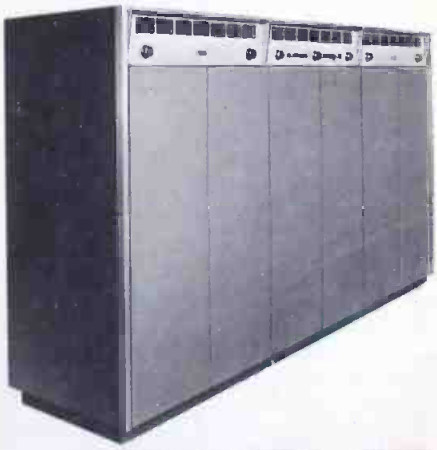
Cost effectiveness—the main reason to choose RCA.

No doubt, you have a dollar picture in mind of how long you want your next transmitter to operate.

An RCA may cost a little more to start with than another transmitter of equal kW rating. But by the time you're ready to replace it, you should have saved substantially on its long-term operation and maintenance.

Make this your year for a new transmitter. Contact your local RCA Representative, or write to us. We'll give you all the right reasons for selecting an RCA transmitter. RCA Broadcast Systems, Front & Cooper Streets, Bldg. 2-2, Camden, NJ 08102.

We sell more TV transmitters in the U.S. than anybody else. With more in operation than anybody else. Now, you know some of the reasons why.



RCA

Circle (19) on Reply Card

Routing switcher roundup

Part 1/By Rolf Drucker

Routing switchers are no longer only for the large TV networks. The distribution of video signals in the TV plant is usually accomplished by fixed wiring, most often through "normals" in jackfields. The facilities engineer designs for the most normal and usual signal distribution. Changes in signal flow can be accomplished through the time-honored method of patching. The location of the main jackfield is usually in master control, which becomes the central switchboard for the plant.

The traffic jam

As more and more equipment is added to the plant, a traffic jam often occurs at key times at this central patching location. The first people to run into this problem were, of course, the operators of the largest plants. Today there are few simple plants left, and it is a universal problem. Rather than have all patching done in one central location, it became desirable to let every signal user, such as studio control rooms, videotape machines, monitoring position, master control, etc., dial up the desired video signal. Again the large operators were the first to install the early, costly routing switchers.

What is a routing switcher? It is a central crossbar switcher, into which are fed all those signals of the video plant which are of common usage. This generally includes all signals (except studio cameras), namely VTRs, ATCs, film chains, remote trunks, control room outputs, network, character generators, frame synchronizers, test signals, etc.

Since every TV plant is different, a lot of thought should be given as to which signals are fed into the routing switcher. It is a cost vs. utility decision into which all the operating personnel of the station should be drawn.

The output channels of the routing switcher (called "destinations") are fed to VTRs, a number of the production switcher inputs, monitoring channels, master control, and outgoing lines to air and net. Thus each of these users of the TV signal can select his input signal independently and quickly without the roadblock of a central distribution desk. Dubbing, editing, control room production, and taping can all occur independently and simultaneously, increasing the efficient use of our very expensive TV equipment.

Since routing switchers will usually have an equal signal path, the "timing" of the video signal will remain constant throughout the distribution.

Making life easier

As the advantage of this type of signal self-selection has been observed, smaller, off-the-shelf routing switchers have been placed on the market, and even the smallest TV plant can make use of them. The smallest and simplest routing switcher, a self-contained 12-in by 8-out video and audio crossbar, is available for well under $4,000. This would be a very useful device for a small plant with a few VTRs, a couple of cassette machines, and one production studio. Since the routing switcher replaces the need for audio and video DAs, it might even save money. By reducing the load on master control it will also save manpower.

These small, centrally-operated mechanical routing switchers cost under $40 per crosspoint, including video and audio switching and tally. Remotely, electrically-controlled routing switchers start a little higher per crosspoint, while some sophisticated, vertical-interval switching units go for well over $100 per crosspoint.

From the smallest, to more sophisticated units with remote signal selection and remote readouts, most of today's routing switchers are built in modular form, so that each user can purchase basic off-the-shelf devices which will be tailored to his particular plant. Most units are built with add-on capability, a very important feature since all TV plants seem to get bigger year by year as new devices are added.

All routing switchers are audio-follow-video; however, some plants may also wish to switch control to film and VTR, tally, and possibly even pulses. Where routing switchers are used to feed production control rooms, thought should be given to split video selection from audio selection. Production audio sources often do not follow video (such as in A-B film rolls), or several audio sources are associated with one video source (full-coat, track, music tape, etc.). All this is possible, but it has to be designed for each TV facility. Your needs and pocketbook will be the decision makers.

Computer controlled

Routing switchers are uniquely adaptable to computer-controlled studio operation. The computer for an "on-air" studio can be programmed to use the routing switcher for program source selection. This can create substantial savings by allowing a smaller "on-air" switcher to be used.

Colleges and universities and similar institutions have a special use for routing switchers, since they usually need to distribute many TV signals to different monitoring locations. In this application it is most desirable to have the user select and possibly control his TV feed when he is ready for it.

As the TV signal is becoming more ubiquitous, new applications will be found for the routing switcher in large and small TV installations.

Switcher roundup

The following is a roundup of routing switcher equipment, the first of two parts. Prepared by the BE staff, it will be continued in the August issue.

continued on page 26

For more information circle bold face number on Reader Service Card: American Data 560AR (100), 561 (101), 900 (102), 3900 (103); Datatek D-400 (104); DI-Tech 5400 (105), 5500 (106), 5800 (107); Dynair 21 (108), 10 (109), Series-X (110), 1400 (111), 8100 (112); Holland Electronics 1684 (113); Image Video Limited 6000 (114), 6100 (115); J & D International 712 (116), 154 (117), 156 (118); 3M Company Mincom Division Comtec 40X (119), Comtec 20X (120), Comtec 20X-B (121), Comtec ENG (122), Comtec 8X (123), Comtec 15X (124), Comtec AX (125), Comtec RX (126); TeleMation TVS/TAS-1000 (127).

Beauty more than screen deep.

A multiple group of matched color monitors is a beautiful sight.

And that's just what you get when you standardize on Conrac monitors, with carefully matched screen phosphors.

But the fact that our Colormatch standard has become the industry standard isn't the reason we outsell all other makes of broadcast monitors six to one.

The real beauty of Conrac monitors is deep inside, where we've maintained a technological leadership position since the beginning.

We've grown up with the industry, and the breadth of our monitor line has grown accordingly. There's a specialized Conrac color or monochrome monitor for every studio application.

Our top-of-the-line color model incorporates some sophisticated innovations that can only be described as breakthroughs, such as our optional comb filter separator.

And even our lowest priced color models feature advanced modular design and front pull drawers for access to critical controls.

Contact Conrac for complete details on all our monitors.

They're a beautiful choice, any way you look at them.

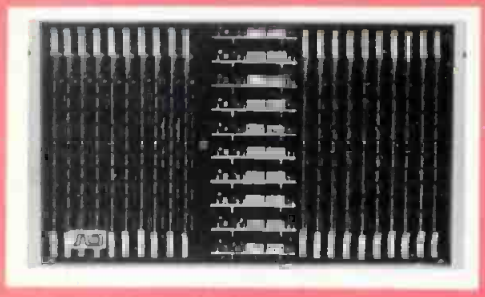
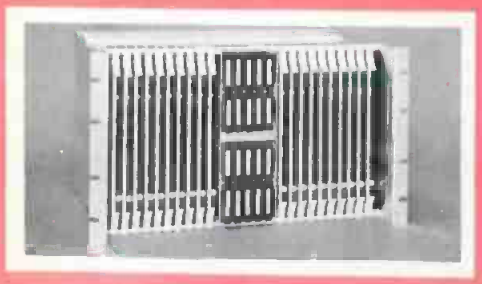
Conrac Division, Conrac Corporation, 600 North Rimsdale Ave., Covina, CA 91722. (213) 966-3511.

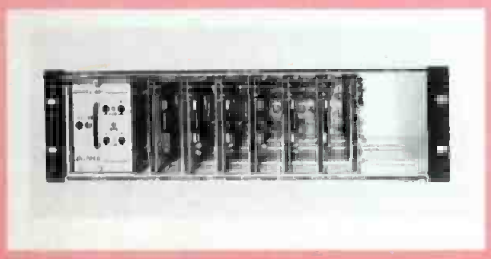
CONRAC

We're more than meets the eye.

Circle (20) on Reply Card

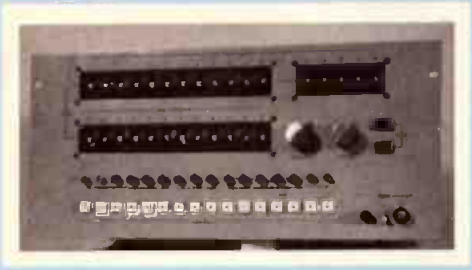
Routing switcher manufacturers

Manufacturer and model number	Model description
American Data	
 560AR	This unit is a 12 input, 1 output remote-controlled AFV switcher.
561	Similar to the 560AR, but features 18 inputs and may be configured for AFV or separate audio/video control.
900	The basic matrix building block is configured with 20 inputs to 10 outputs and may be controlled by a variety of devices from simple thumbwheel switches to complex computer-access systems. Unit can be retro-fitted for stereo audio switching if desired by adding the 1900 series audio matrix.
3900	Introduced this year, the 3900 series utilizes advanced microprocessor technology for multi-level distribution of audio, video and high-speed digital information. No proprietary components or devices are used. Each video matrix frame is output-oriented and may be configured with from 10 to 40 inputs or outputs up to a maximum of 400 crosspoints per unit. Individual units may be combined to form the building blocks of any ultimate system configuration. The audio matrix conforms to SMPTE Type C specifications and provides up to three levels for distribution of program audio 1, program audio 2, and SMPTE time code information. Audio and video switching modules are contained in separate frame assemblies.
Datatek	
 D-400	Dynamic range is over 100 dB. Features include independent, simple and flexible control facility for each output bus; standard BCD positive logic, computer-compatible control systems; multi-reference vertical interval or random switching facilities for each bus; four-section continuously adjustable cable equalization on both inputs and outputs. System expansion provision is built into the basic matrix frames—no need to initially specify ultimate size of system. New units introduced to the D-400 series are the D-480 audio-only routing switcher (for use where a second level of audio is required) and the D-481 SMPTE time code routing switcher. The D-481 is designed to pass cue track audio at 0.25% maximum distortion 20 Hz to 20 kHz and still have the capability of handling SMPTE time code pulses at fast rewind speeds.
Di-Tech	
5400	Matrix is up to 12 inputs by 2 output busses. The unit is audio-follow-video with vertical interval switching. Electronics housed in 1¾-inch frame; modular plug-in cards are used for input expansion. Can be purchased in a 4 x 1, 8 x 2 or 12 x 2 configuration. Control panels are separate from the electronics and illuminated momen-

Manufacturer and model number	Model description
	tary pushbuttons are used for control. Output expansion is via the loop-through method.
 5500	This audio-follow-video unit has a matrix configuration of up to 28 inputs with 2 output busses. Switching plug-in modules are arranged in a 4 x 2 format and the last plug-in card in the frame contains the audio and video amplifiers. Inputs are high-impedance bridging; output expansion is achieved via the loop-through method. Vertical interval switching is standard. Control panels are separate and illuminated momentary push-buttons are used for control.
5800	This unit is designed for applications where large switching matrices are required. Inputs and outputs are easily expandable and can be supplied as audio-follow-video, audio only, or video only. Vertical interval switching is standard and audio breakaway is an option. Standard features include differential inputs; DC restorer; sync adding for non-composite signals; numerical readouts for crosspoint status on the video 20 x 1 module; three channels of audio; and BCD parallel control. The 5800 series has separate frame assemblies to house the audio and video electronics: the 5801 contains the video and the 5802 contains the audio.
Dynair	
 21	This is a microcomputer-controlled matrix switcher with 10 x 10 to 1000 x 1000 system capability. Switching for video, audio, data and machine control. Up to eight control levels, follow or breakaway. Power failure memory protection. Control system self-diagnostics; module replacement without need to power down.
10	Video and audio 10 x 10 solid-state switching system. Has vertical-interval video switching for color and monochrome systems. Microprocessor-based control system allows local and/or remote-control operation.
Series-X	Features of these video switchers include pushbutton control of all input-to-output combinations; solid-state and mechanical construction throughout; modular design expandable up to 60 inputs and 120 outputs; minimum crosstalk and low-frequency transients; excellent color performance.
1400	Low cost per crosstalk. Control flexibility offers the use of discrete control, BCD control, and momentary BCD control. Can be expanded beyond a single 20 x 20 frame either by input expansion or output expansion.
8100	This audio switcher accepts 600-ohm balanced audio and meets or exceeds the performance required by broadcasters. Is adaptable to practically any input-output configuration or overall switcher size.

continued on page 28

Manufacturer and model number	Model description



Holland Electronics

1684 — This audio switcher is designed for interface to any standard video switcher head for remote-controlled audio-follow-video control of 16 audio sources from up to 20 video selects. Each control head features AFV or audio-only selection, true tally from each crosspoint, and remote gain control of separate program and monitor outputs from the selected crosspoint. Can accommodate up to eight remote control heads.

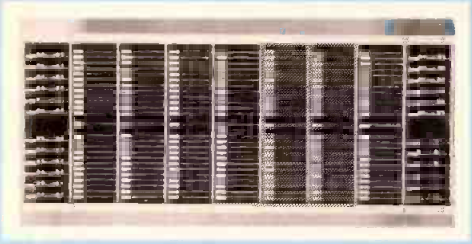
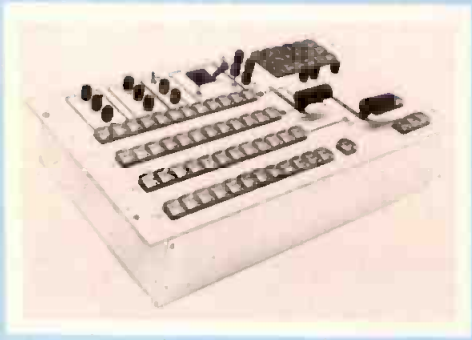


Image Video Limited

6000 — This series is specifically designed for medium and large routing systems of television circuits. Compact 5 x 1 or 10 x 1 crosspoint modules plug directly into the mother board assembly which also accommodates the input and output amplifier modules. Features include solid-state random or vertical interval lap switching and tally LEDs on each video crosspoint which indicate exact switcher status at all times.

6100 — Similar to the 6000. Like the 6000, the 6100 has video and audio specifications for full color broadcast use. A wide variety of control systems is available, as well as computer interface.



J & D International
(Distributed by Beaveronics Inc.)

712 — The 12 video input, 4 output switching matrix consists of 12 single input, 4 output switching cards. Each input has an input amplifier with clamping. All modules are plug-in and are accessible from the front panel of the rack-mounted electronics package. Standard features include built-in black burst generator, colorizer, and RGB chroma keyer; adjustable soft wipe and border edges; built-in pattern modulator with frequency and amplitude controls; and pattern-limit controls for pre-setting size of patterns or varying vertical and horizontal aspect ratio.

154 — Features include loop-through, high-impedance input amplifier; isolated tally closures; remote rack-mounted electronics; positioner joystick; 32-pattern mix-effects, color black and color matte background; and a mix-key unit.

156 — Similar to model 154 in basic design and electronic sub assemblies. Has two mix-effects units (includes keying functions). Two remote outputs are available—remote control panel and amps required.

3M Company Mincom Division

Comtec 40X — What is unique about this unit is the microprocessor system employed for every channel to eliminate a total system failure if the logic system malfunctions. The logic

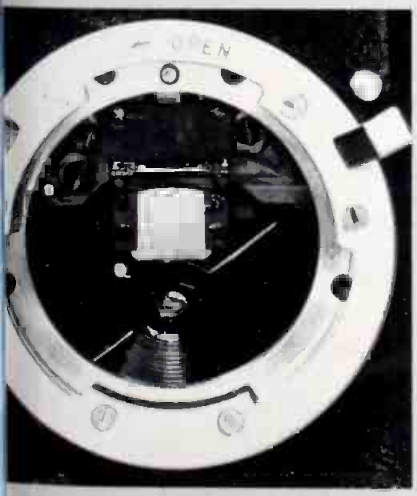
continued on page 30

Announcing the "New Generation" CP-16R

Everything you've come to expect from CP-16R cameras plus lots more...at no increase in price!

Our "new generation" CP-16R cameras now incorporate several significant changes which improve CP-16R performance in extreme low-light situations. Improvements which our engineers were able to accomplish without compromising any of the outstanding performance standards that have made the studio-silent CP-16R famous the world over. In fact, we've even managed to improve on these standards by making the CP-16R run more quietly than ever before!

What's equally important, especially to the independent filmmaker who works under tight budget restrictions, is that we have been able to add these improvements to the CP-16R camera line *without raising prices* (something of a manufacturing/ marketing miracle in these days of runaway inflation)!



New Shutter System

Our new belt-driven, focal plane-type, high-efficiency 170° mirror shutter now provides approximately 10% more light to the film plane. (And the elimination of one gear pass makes the new CP-16R even more silent in operation.)

New Viewfinder System

The new CP-16R standard viewfinder now features positive click-stop 90° rotation. It provides 12X magnification and a far brighter image than ever before... further enhancing CP-16R performance in low-light conditions.

New Carrying Handle

Even the camera carrying handle has been re-designed. It is now larger and much more comfortable when toting the camera about.

Be sure to visit your local CP-16R dealer and check out all these new improvements as well as *overall* outstanding CP-16R performance. Remember, "new generation" CP-16R cameras are available for immediate delivery at no increase in price.

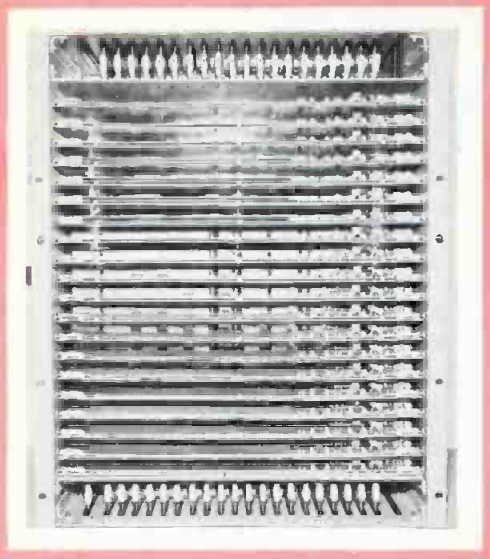
CP-16R shown with wide angle *Ultra T* 9mm prime lens (T1.35). Other prime lenses in Cinema Products' *Ultra T* series include 12.6mm, 16mm and 25mm lenses, all rated at T1.25.

For further information, please contact:

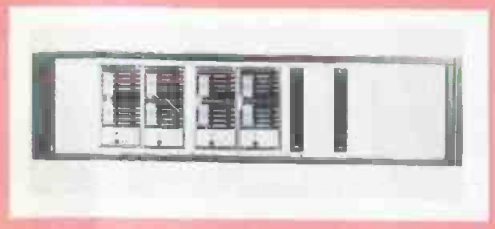
cinema products CORPORATION

Technology in the Service Of Creativity

2037 Granville Avenue, Los Angeles, California 90025
Telephone: (213) 478-0711 ■ Telex: 69-1339 ■ Cable: Cinedevco



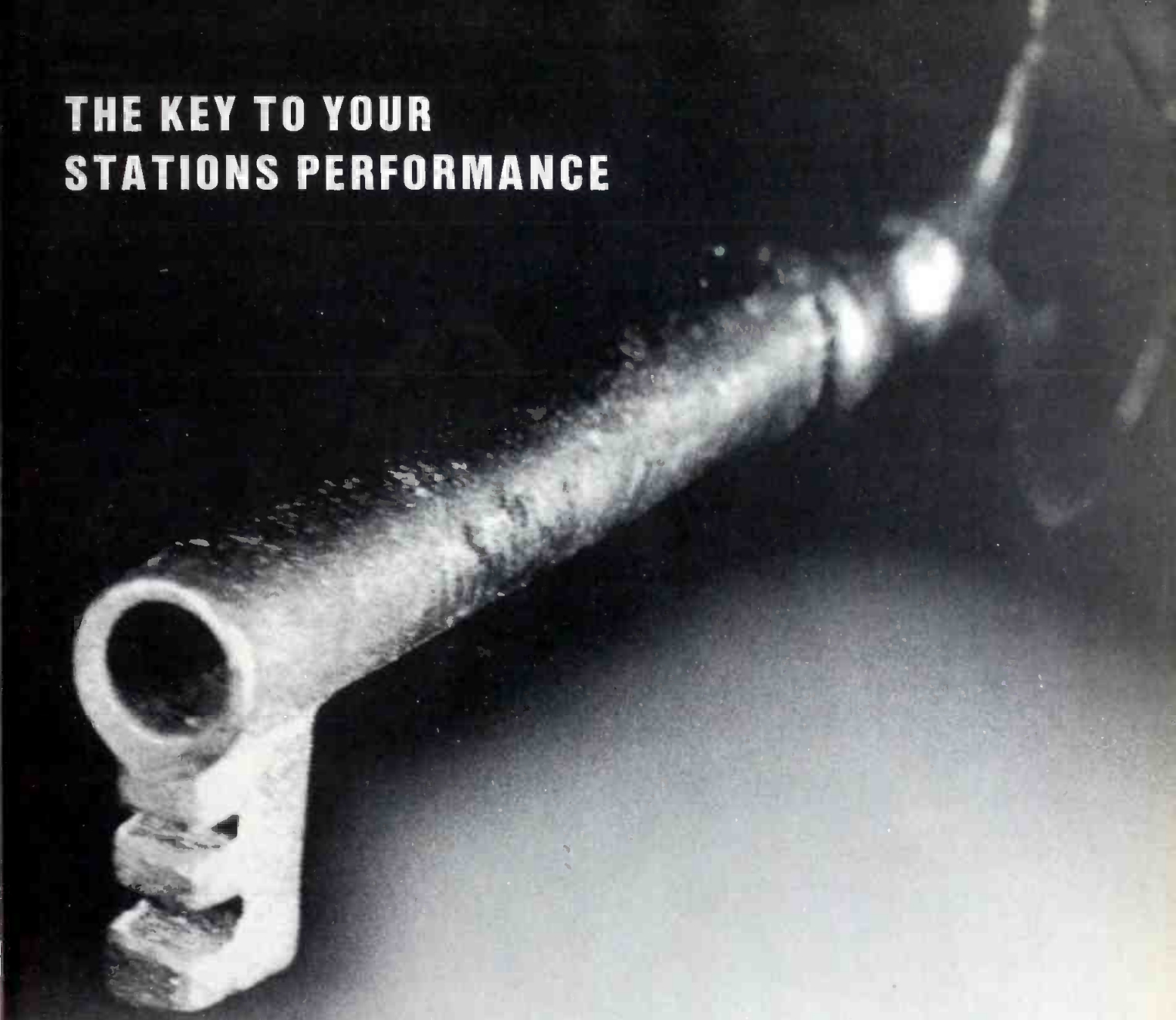
Manufacturer and model number	Model description
	system allows any type of control to be used without changes to the logic. Up to 40 inputs can be accommodated in the same main frame, and frames can be added to handle systems in excess of 40 inputs.
Comtec 20X	20 x 10 matrix module incorporates modular plug-in construction. Five-level matrix permits simultaneous switching of video, two audio signals (including all amplifiers), and two bi-directional paths for various auxiliary functions. Features CMOS logic, module interchangeability, output orientation, and tally feedback.
Comtec 20X-B	Designed for those who do not require the five-layer switching capability of the 20X.
Comtec ENG	According to the company, this is the only ENG switcher on the market today. Three control panels are designed to provide assignments to three VTRs, three time base correctors, and three time code generators. Nine different sources can be selected to interface with the TBCs and TCGs for dubbing, editing, monitoring, or airing.
Comtec 8X	Designed for the application where a small number (4 or 8) inputs and a large number of outputs are required. A single 8¾-inch-high rack mount card frame will house up to an 8-in by 20-out matrix with solid-state switches for both video and dual audio (or auxiliary).
Comtec 15X	This modular unit features LED status indicators; remote or local control; bridging crosspoints; low crosstalk; second audio level; three frame sizes (2, 6 or 12 inputs); and up to 15 inputs per frame.
Comtec AX	Can be purchased in increments of four inputs and any number of outputs. All solid-state unit has plug-in construction; balanced input and output amps; and optional transformer input.
Comtec RX	Features electronic crossbar switching so any input can be switched to any or all outputs with no loading or switching interference. Modular construction. Solid-state switching includes input and output amps.



TeleMation

TVS/TAS-1000	Has up to 1,000 crosspoints per 8¾-inch chassis. Features include solid-state crosspoints with vertical interval switching; single-coax "party-line" control; wide selection of bus controls and status monitors; dual video outputs; and automatic restoration after power failure, with Refresh Memory option. No splitters, combiners or distribution amplifiers required regardless of system size or expansion requirements. Recent additions to the switcher are the CP-1020 remote control panel which can switch any one of 20 input signal sources to a single output bus; the SM-1030 status light display which monitors the "party line" and identifies the output users through the use of LEDs; and the CP-1010 category/number control panel which can switch any one of 100 inputs to a single output bus while requiring only 1¾-inch space in a standard 19-inch rack.

THE KEY TO YOUR STATIONS PERFORMANCE



YOUR STATIONS PERFORMANCE IS MEASURED IN MANY WAYS. Technical quality, advertiser acceptance, and most importantly, listener acceptance and station profitability. The key to all this is simply how good you sound.

This is why you will find our over 150 products so unique. They are all designed for the one specific purpose of improving your stations performance . . . from your sound to your bankbook.

Our 14 different audio consoles for example, all incorporate a revolutionary method of controlling audio via DC voltages. This means two things, to you. FIRST, the DC control concept makes these consoles the quietest on the market. No pops, clicks or mechanical clanks when switching functions. This same technology enabled us to design in a host of other exclusive features found only in Ramko units. The now famous solid state meters. The individual input gain select patch panels. The switch programable mute/on air relay select. The optional, plug in, external equipment remote control. The list goes on but, in short these consoles will provide you with a purity of reproduction and ease of operation that few broadcasters have experienced before. SECONDLY, since all 14 models have been keyed specifically to the broadcasters needs you have a better chance of getting exactly what you want without either overspending or settling for less because of budget limitations. 5 - 8 - 10 and 12 mixer versions. Mono, stereo/simulcast, single or dual channel, and slide or rotary mixers. The 12 mixer even has an optional extender for expansion to 20 mixers. Ask for our new, detailed brochures today. We think you'll agree that feature for feature, spec for spec, warranty for warranty, these are the most advanced units on the market today.

The best console on earth will be for naught if the same high quality is not utilized throughout your audio chain. From the turntable preamp right on up to the transmitter. That is why you will find the same high degree of performance in all of our other products. Turntables - Mic, Line and Turntable preamps - Power amplifiers - Distribution amplifiers - Audio routers and switchers - Reel/reel and tape cartridge R/P units - Portable and fixed cassette decks - Portable mixers - Equalizers and tape cartridge winders. If its for the studio RAMKO has it.

Your success revolves around your stations performance . . . ours revolves around the same thing. So, if you are planning new studio facilities, upgrading your current studio or looking toward AM stereo let us show you how to unlock all of your stations potential. Write, wire or call collect today for further literature or better yet take advantage of our 2 week trial period and see for yourself.

RAMKO RESEARCH

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

Circle (22) on Reply Card

Translating film values to television lighting

By Ron Whittaker

George Spiro Dibie, master lighting director, discusses his techniques and makes some predictions.

"There have been a lot of people from (theatrical) film who have now come into video in the last four to five years and we say (to engineers) 'hey, we don't care about your 'scopes, our producer wants a certain effect and that's what we've got to get.' "

These are the words of one of Hollywood's most successful lighting directors, George Spiro Dibie. Dibie (pronounced dee-bee) has 20 years of film and video experience. He has worked on major feature-length films for Warner Brothers, 20th Century Fox, Metro-Goldwyn-Mayer, and Paramount. In recent years he has been a lighting consultant for numerous commercials and network television shows. Dibie is a director of photography and currently the president of the American Association of Lighting Directors.

Why does a successful "Hollywood" lighting director turn to video? Well, in Dibie's own words, it's because television is a "now medium."

"In film when I used to shoot all day I never went home relaxed. I had to wait until the next day (to see the results).

"With TV you don't wait, you can see exactly what you are getting and you can make any changes right on the spot."

continued on page 34

George Dibie checks the interaction of a key light with a camera on the set of the "Barney Miller" show. Dibie is also lighting consultant for two other ABC series: "Fish" and the new "AES Hudson Street."

An ***AUDIO-VIDEO*** routing switcher for today—tomorrow—or 10 years from now

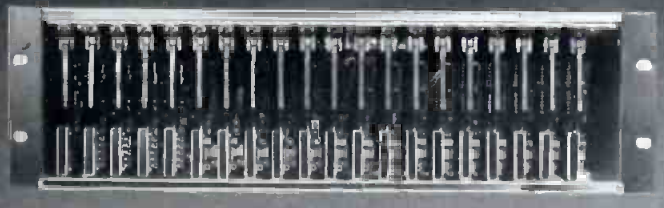
Do not *OUTDATE* yourself so quickly

Buy **di-tech** —here's why

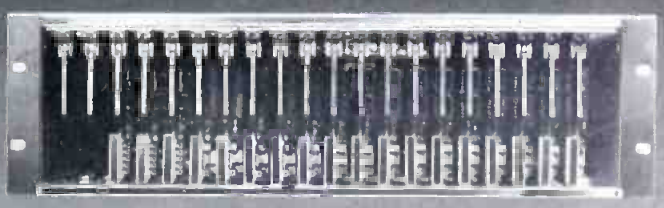
- **Expandable inputs/outputs**
- **3 audio channels**
- **Outputs are destination orientated—20 x 1 crosspoint modules**
- **20 x 15 AFV matrix in 10½" rack space**
- **Separate audio and video assemblies**
- **Numerical readouts on 20 x 1 modules for crosspoint status**
- **Differential inputs, D.C. restorer, sync adding**
- **BCD control**
- **Vertical interval switching**

MODEL 5800 SERIES

20 x 15 AFV ILLUSTRATED



MODEL 5801 VIDEO ASSEMBLY



MODEL 5802 AUDIO ASSEMBLY

ADDRESS: 311 Wyandanch Ave., North Babylon, N.Y. 11704 • TEL. NO. (516) 643-4040

Circle (23) on Reply Card

Translating

continued from page 32

"Source lighting"

Dibie's approach to dramatic lighting has been called "source lighting" and "video verite." Basically, this approach entails the simulation of all of the natural sources in a setting—table lights, ceiling lights, windows, etc. The basic key lights are matched up with these angles. The result is a realistic, believable lighting effect.

Because most source lights are softer than standard Fresnels, Dibie almost always adds diffusion to keys. And because diffusion slightly shifts color temperature (reducing it 150 to 200 degrees) Dibie uses "one-eighth blue" gels to bring the keys back to a pure 3,200. Since gels are normally not available for such subtle color corrections, Dibie has the one-eighth blue gels especially made by an English manufacturer.

"I don't mind video noise, it gives a cinema verite look of realism."

Back lights are standard, undiffused Fresnels. Fill lights, however, are highly diffused. A 1:3 key-to-fill ratio is typical on "Barney Miller." In addition to "Barney Miller," Dibie is currently a lighting consultant for two other ABC shows produced by Danny Arnold: "Fish" and the new "AES Hudson Street."

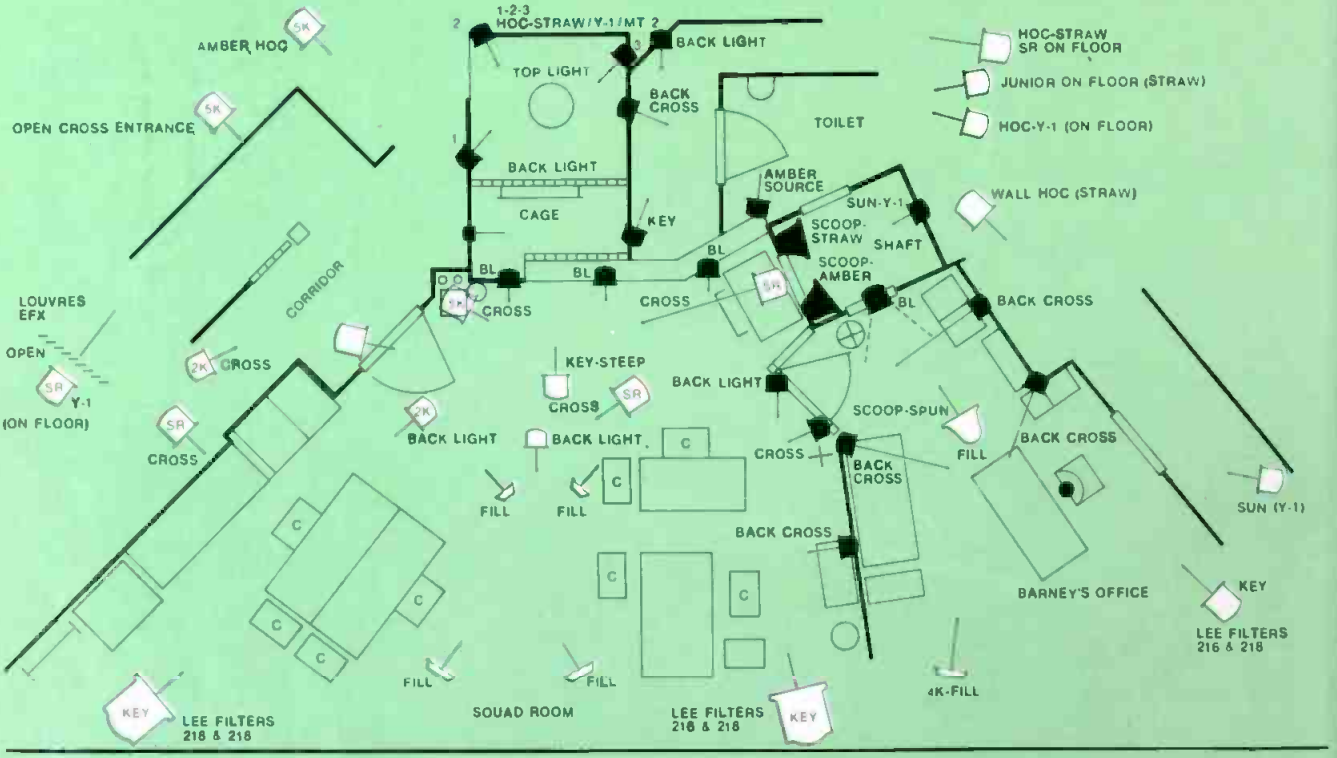
An iconoclastic approach

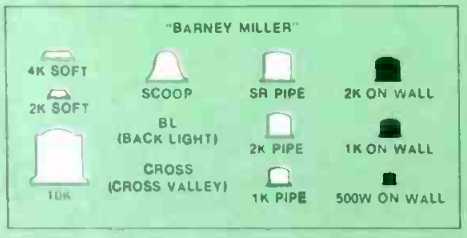
Not only does Dibie hold little reverence for some of the established lighting approaches, but he also regularly pursues an effect at the expense of established engineering practices. And, if it weren't for the fact that his unorthodox approaches have won him considerable respect in the industry, he would probably be regularly bounced out of video control rooms.

For example, there is the issue of video noise. According to Dibie, "I don't mind video noise, it gives a cinema verite look of realism." Video noise reminds Dibie of the textured grain effect of film when it is shot under less-than-ideal circumstances.

But, if Dibie shows a lack of concern for some of the traditional technical values, he more than makes up for it in artistic concern. For example, he has spent many hours researching the "look" of a

continued on page 36





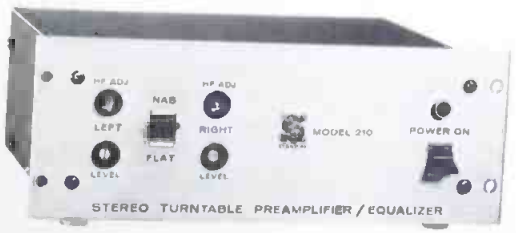
This is the simplified lighting plot for "Barney Miller," as provided by Dibie. Once the plot is basically established, it is turned over to ABC lighting director John Appleroth, who directs the actual lighting setup. With an efficient crew, a show such as "Barney Miller" can be completely lit in about 10 hours.

Shhh!!!

This is strictly off the record. If you want to get "off the record" what's on the record then use the Technics SP-10 Mark II turntable, the Micro-Trak #303 tone arm, the Stanton #681-SE cartridge, the Stanton #D 6800-SE stylus and the Stanton #210 Pre Amp. House these parts in the Grinnan Utopia turntable cabinet and you can rest assured you will get it all off the record. Prices listed below are cash with order.

SP-10 Mark II turntable	$575.00
#303 Micro-Trak tone arm	$ 79.50
#681-SE Stanton cartridge	$ 39.50
#D6800SE Stanton stylus	$ 17.50
#210 Stanton Pre-Amp.	$219.50
Ginnan Utopia II turntable cabinet	$475.00

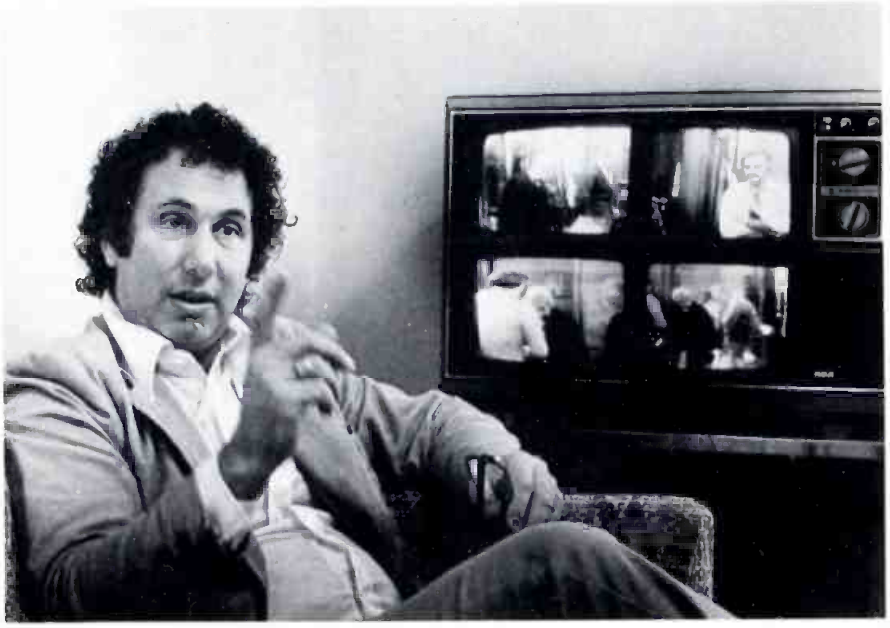
On the record our phone number is 216-862-2323.
Send for brochure on our record tape and storage cabinets.



Grinnan Fixture Company
16041 Georgetown Street, N.E.
Minerva, Ohio 44657
Circle (24) on Reply Card

Translating

continued from page 34



George Dible has made a number of interesting predictions about the future of film and television. He says that within the next 5-10 years, 70% of "Hollywood-type" feature films will be produced on videotape by high-resolution video techniques. He also feels that television will be moving to a one-camera technique for drama, an approach long associated with film production.

historic period called for in a production.

"In the Mary Tyler Moore special I found art books which represented the historic periods in the script. I then tried to duplicate the 'look' with lighting. In one period, for example, I used straw and lemon gels to recreate both the quality and the color of the light."

To retain this look in the video, Dibie had the cameras set up and color balanced under 3,200 degree Kelvin illumination on these scenes, and the camera settings were retained when this illumination was shut off and the special period lighting was switched on.

Film values brought to television

What Dibie is doing with television lighting is not unlike the approach that has been a part of film for decades. It was producer Danny Arnold—a man with considerable film experience—who insisted on retaining some of the artistic strengths of film in his video-

continued on page 38

PHILIPS®

The Stars of NAB's INNOVATION '78

LDK-25...our renowned, state-of-the-art camera family. Introducing a major new breakthrough in pickup tube and circuitry technology.

LDK-14...exciting, NEW ⅔" broadcast camera for ENG/EFP/Studio versatility...years ahead of the competition.

NEW Philips I.F Transmitters...
UHF and VHF transmitters, replacement exciter. Over 1,000 now in use world-wide!

Incredible VIDEO 80...
convertible camera and complete production system for multi-use applications.

These are part of the innovative cameras and broadcast technology that made such a hit at NAB '78. For the full story on the product(s) of interest to you, write or call us today.

PHILIPS®
PHILIPS BROADCAST EQUIPMENT CORP.
A NORTH AMERICAN PHILIPS COMPANY
91 McKee Drive, Mahwah, N.J. 07430

INNOVATIVE LEADER IN WORLD TELEVISION

Farah Fawcett-Majors' Wella Balsam commercials took some special lighting to bring out the best in her hair. Here, George Dibie, lighting consultant on the production, discusses how she should hold her head.

Translating

continued from page 36

tape productions. (See the story on Arnold's innovative directing approach in the March edition of **Broadcast Engineering**.)

In speaking of the problems associated with typical multiple-camera tape production Arnold said, "Most tape shows have a really shallow look to them. You don't get a great deal of depth or dimension. Then I found the one man, George Dibie, who had spent a lot of years trying to translate film values to television (with) cross-lighting and so on."

One of the things that Dibie did on the "Barney Miller" show was to reduce the overall illumination on the set by one half: from the standard 250 footcandles down to 125 footcandles.

This meant that cameras had to open up from their normal setting of f:4 to between f:3.5 and 2.8. This reduced depth of field, which increased selective focus and rack-focus control, both common film techniques. (Selective focus forces your audience to concentrate on one distance plane, since all others are fuzzy, and with rack focus you can shift viewer attention in the picture by racking from one plane of focus to another.) Although 125 footcandles is now the normal overall light intensity on the set, one episode depicting a blackout was shot with only 50 footcandles of illumination.

Since lights have a tendency to burn out at inconvenient times, Dibie always has one or two lights on floor stands standing by, ready to be rolled into place until there is a long enough pause in the production to allow a lamp change. This technique generally works for all but the major lights which would

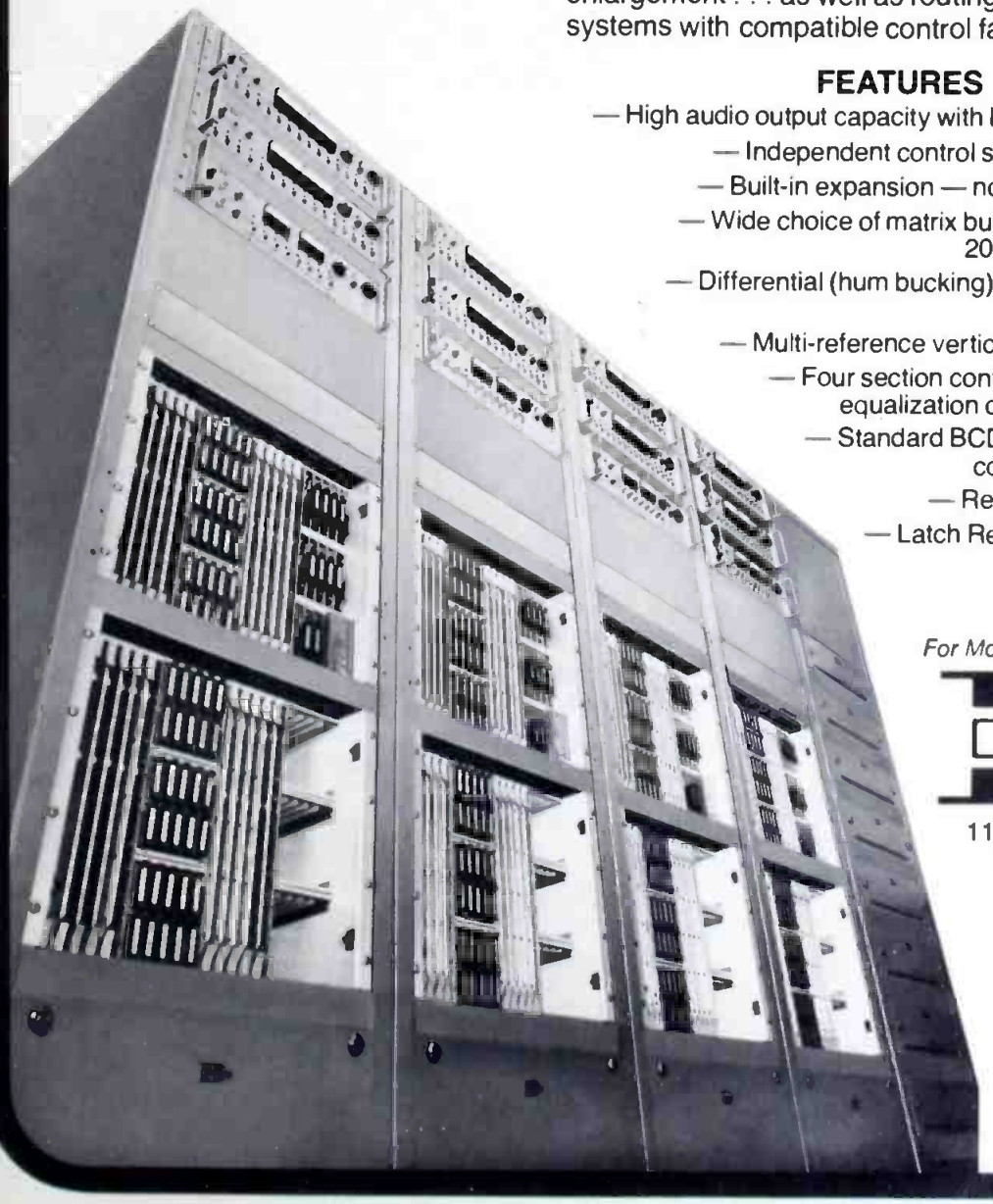
continued on page 42

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

Circle (28) on Reply Card

A Panasonic ¾" direct-drive editing system this good is no surprise.

It doesn't make much sense to build a ¾" editing system around two expensive editing recorders when one editing recorder and one less expensive player/recorder are all you really need. That's why you need the economy and direct-drive performance of Panasonic's Series 9000™ ¾" editing system. The NV-9500 editing recorder, the economical NV-9200 player/recorder and the amazing editing controller that goes between them, the NV-A950. Together they give you the kind of performance you expect from Panasonic, along with considerable savings over comparable editing systems.

When used with the NV-9500 and NV-9200, the NV-A950 will execute frame-by-frame insert and assembly edits, automatically. There's a five-minute memory for entry and exit points of video and audio inserts. And for quick and precise location of the exact edit points, the NV-A950 also has controls for fast play (double speed), search (one-fifth speed), slow rewind and pause. There's also a rehearsal mode that lets you run through an edit before you actually perform one.

And you'll be able to perform an edit in style. Thanks to the NV-9500 and the NV-9200. Especially since both decks give you the precision of direct-drive video head cylinders, the speed

Under $10,000 is.

accuracy of the capstan servo system and the toughness of patented HPF ™ video heads. The results: Excellent stability, low jitter, high resolution (330 lines B/W and 250 lines color) and a video S/N ratio of 45 dB.

And if performance this good from Panasonic doesn't surprise you, then neither will our kind of reliability. Like the strength, stability-of-alignment and long-term durability that our annealed aluminum die-cast chassis gives you.

There's a lot to be said about the advantages of using the NV-9500 and the NV-9200 together, but there's just as much to say when you use them separately. You can use the NV-9200 as a high-quality master recorder. Or for dubs that look almost as good as masters, use it as a high-quality dubbing deck. And with the NV-9500 editing recorder, you'll also get frame-by-frame insert and assembly edits without tear, roll or loss of video information.

Both decks also include automatic rewind. Auto search. BNC and 8-pin connectors. Chroma level adjustments. Subcarrier and vertical sync inputs. And non-locking pushbutton controls. All in simulated wood cabinetry.

Panasonic Series 9000 ¾" editing system. If its performance doesn't surprise you, its price will.

For more information, write: Panasonic Company, Video Systems Division, One Panasonic Way, Secaucus, N.J. 07094

In Canada, contact Panasonic Video Systems Department, 40 Ronson Drive, Rexdale, Ontario M9W 1B5.

Panasonic®
just slightly ahead of our time.

NV-9500

Circle (16) on Reply Card

Translating

continued from page 38

suddenly become conspicuous by their absence in a scene.

Reference white

The brightness range in scenes (and, therefore, the camera settings) is carefully controlled by Dibie through the inclusion of 60-percent reference white areas in each scene. Objects or papers which threaten to exceed the 60-percent reference white are brought down with tinted hair spray. In the case of a white cotton shirt, it is washed in coffee or tea to pull it down to a manageable reflectance value.

Lighting also plays an important role here. Backgrounds can easily be raised or lowered in value by controlling light intensity (generally with scrims). Background illumination generally falls considerably below the 125 footcandle level established for the primary key and fill areas.

Actually, Dibie does not work directly with the lighting crew on the ABC shows. The actual lighting director is John Appleroth and Dibie, as a "lighting consultant" on the shows, works through Appleroth. Although the Dibie-Appleroth combination has resulted in a very effective working relationship, the lighting consultant-lighting director separation is in part due to union requirements.

Predictions about production techniques

Although interviewing Dibie about his approach to lighting proved to be most interesting in itself, his

continued on page 44

The recent Mary Tyler Moore special required some rather sophisticated staging and lighting. With the help of an incident light meter, Dibie establishes a balance in lighting intensity between the different areas of the set.

WHAT TO DO DURING YOUR NEXT OBSCENE PHONE CALL.

Order Eventide's BD-955 Broadcast Delay Line. It will delete your obscenities & tape loops. And more.

When Eventide — the world's foremost manufacturer of digital delay equipment* — decided to build a better time delay system for obscenity deletion, it went digital.

The result is the BD-955, a RAM based DDL providing up to 6.4 seconds of delay.

Substitute the BD-955 for the tape machine you're now loading, monitoring and changing tapes on. The BD-955 will allow plenty of time for either the engineer, announcer — **or both** — to hit remotable DUMP buttons.

The BD-955 cancels the objectionable program material; its rear-panel terminals allow automatic control of the phone and/or auxiliary equipment.

**According to Billboard Magazine's latest U.S. Equipment Brands Usage Survey, 44.9% of major U.S. recording studios use Eventide delay equipment vs. only 6.0% for the nearest competitive digital.*

THE BD-955's EXCLUSIVE CATCH-UP MODE:

Here's where the BD-955 really shows its stuff — and makes the switch to Eventide obscenity deletion as much a programming decision as a technical one —

When the DUMP button is hit, **programming instantly returns to real-time.** With no necessity to fill the air with "7 Second Announcements" or stand-by jingles. The show goes on. The BD-955 cancels the obscenity and automatically builds back to full delay time. Digitally: without wow or flutter and no need to stand by for rearming an obscenity loop. The program continues immediately — with sufficient time delay for the announcer to take the next call. No excuses necessary. Sound like magic? We've manipulated time like this for over five years.

When it's not being used for obscenity deletion, the BD-955 serves double-duty as a production tool. It allows front-panel selection of delays from 6.5 milliseconds up through the full delay available, for musical and segue effects — including vocal doubling and automatic double tracking (the audible illusion through which a single voice or instrument is made to sound like two) and digitally-clean slapback echo.

Other significant features about the BD-955 Broadcast Delay Line:

1. Full 15 kHz response and 90 dB dynamic range equals the specs of the best music recording delay lines; 7.5 kHz response, perfect for telephone talk shows *at lower cost*.
2. Full digital Random Access Memory. Like the Eventide 1745M music recording DDL, it runs cool, can take the mallet.
3. *It's available*. With more experience than any other manufacturer in building digital audio delay systems, the BD-955 is an extension of proven techniques. More than just a design: it's available now!

Pricing Information

		FREQUENCY RESPONSE	
		7.5 kHz	15 kHz
DELAY	1.6 seconds	$2300	$2950
	3.2 seconds	$2950	$3900
	6.4 seconds	$3900	$6300

DUMP AND GO!

Eventide's BD-955 Broadcast Delay Line.

Available for immediate shipment through:

KS THE KEN SCHAFFER GROUP, INC.

10 East 49th Street • New York, N.Y. 10017 • (212) 371-2335

Circle (30) on Reply Card

Translating

continued from page 42

predictions about future production approaches were even more thought-provoking.

For example, Dibie feels that within the next 5 to 10 years, 75 percent of "Hollywood" feature films will be mastered on videotape before being transferred to film (if, indeed, they aren't beamed directly to theaters by satellite by that time).

Even now, according to Dibie, some film producers are very seriously investigating the major advantages offered by a high-resolution, 24-frame, RGB-video approach to production. Present super high-resolution television technology now exceeds the resolving power of 35mm motion picture film, which means that scan lines are totally invisible. Although it is not widely known, at least one recent major motion picture which played in theaters throughout the country was primarily produced on videotape.

Feature films to be mastered on videotape, then transferred to film.

The second prediction by Dibie involves the "film look"—something that producer Danny Arnold is especially interested in. According to Dibie, there will be a move to one-camera video techniques in dramatic productions. These will be done exactly like traditional one-camera film approaches, with each scene individually staged, lighted, rehearsed, and shot for one camera angle. (However, there will probably be a back-up cover shot by another camera, in case it is useful in editing.)

And so, like producer Danny Arnold, George Dibie is bringing the best of film to today's television. Lifeless, flat lighting, long associated with multiple-camera television, is being replaced with "video verite" and "source lighting."

Hopefully, as video continues to take over the territory of film, it will do so without sacrificing much of the technical artistry associated with filmmaking. With people like Dibie (and Danny Arnold) joining the video ranks, television may well be able to incorporate much of the rich heritage of film into its future. □

Since you can't plan the city around an antenna, we planned our antenna around the city.

Potential frequency congestion problem? Before you move your site, check with Andrew. We have the only 10-metre earth station antenna optimized for use in frequency congested areas. Send for details.

UNITED STATES: 10500 W. 153rd St., Orland Park, IL, Tel. (312) 349-3300. AUSTRALIA: 171 Henty St. Reservoir, Victoria 3073, Tel. (03) 460-1544. BRAZIL: Av. Victor Andrew, 585, Caixa Postal 600, 18100 Sorocaba, São Paulo, Tel. (0152) 28900. CANADA: 606 Beech St., Whitby, Ont. L1N5S2, Tel. (416) 668-3348. FRANCE: B.P. 44, 28400 Nogent-le-Rotrou, Tel. (37) 52 19 06. GREAT BRITAIN: Lochgelly, Fife KY5 9HG, Tel. (0592) 780561. MEXICO: Av. Reforma 445, P.B.–K México 5, D.F., Tel. (905) 525-5443. ITALY: Viale Bianca Maria, 5, 20122 Milano, Tel. (02) 784412.

ANDREW

Circle (33) on Reply Card

Electromagnetic pulse (EMP) protection for EBS stations

By Joe L. Dehorty

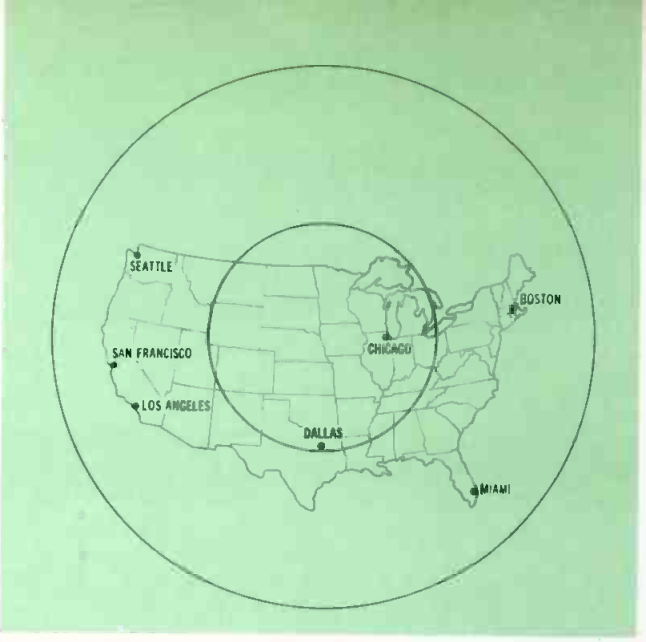


Figure 1 EMP coverage of the United States with a height of burst (HOB) of 100 km for the inner circle and a HOB of 500 km for the outer circle.

The Defense Civil Preparedness Agency (DCPA), which was previously known as the Office of Civil Defense (OCD), was established to provide protection for the population of the United States against the effects of nuclear attack. In fulfilling the mission objectives, DCPA saw the need to provide emergency public information to the population. To accomplish this goal, DCPA established the federally-funded Broadcast Station Protection Program (BSPP) in the early 1960s in conjuction with the now defunct CONELRAD system.

The BSPP consists of equipping selected AM broadcast stations with fallout shelter facilities, emergency power generators, which have 14-day fuel supplies, programming equipment to sustain emergency broadcast, and remote pickup units (RPUs) to interconnect the broadcast fallout shelter facility with the local Emergency Operations Center (EOC). It is DCPA's intention to equip one station per Emergency Broadcast System (EBS) Operation (local) Area with the above items. The station that is normally selected is the Common Program Control Station No. 1 (CPCS-1) for that area.

The danger of EMP

One of the effects produced from the detonation of a nuclear weapon is electromagnetic pulse (EMP). Studies conducted in the years since 1960 have identified EMP to be a threat to electronic and electrical systems. The electromagnetic fields radiated from nuclear detonations vary greatly with weapon yield and detonation location. The EMP fields produced by low altitude detonations attenuate quickly with distance from the blast and are normally accompanied by shock waves. Exoatmospheric detonations produce high EMP fields (5×10^4 volts/meter) and can cover a geographical area of the whole United

continued on page 48

DCPA regional offices

DCPA Region One
Federal Regional Center
Maynard MA 01754

DCPA Region Two
Federal Regional Center
Olney MD 20832

DCPA Region Three
Federal Regional Center
Thomasville GA 31792

DCPA Region Four
Federal Center
Battle Creek MI 49016

DCPA Region Five
Federal Regional Center
Denton TX 76201

DCPA Region Six
Federal Regional Center
Bldg 710
Denver CO 80225

DCPA Region Seven
Post Office Box 7287
Santa Rosa, CA 95401

DCPA Region Eight
Federal Regional Center
Bothell, WA 98011

About the author

Dehorty is the facility chief of USACC Santa Rosa, California, facility, and has been a communications specialist for that facility for the past five years. He has worked in broadcast and public safety communications for more than 19 years.

His experience in providing EMP protection for broadcast stations began in 1969 with WKZO, Kalamazoo, Michigan, which was the first radio station to be protected against the effects of EMP. Because of his background in the broadcast media as well as his knowledge of EMP and associated protective devices, he was then chosen to teach a seminar to the EMP specialists from the other DCPA regions.

To date, he has conducted or assisted in conducting EMP surveys and retrofits for 22 stations, including seven 50 kW stations.

NEED MONITORS NOW?

Lenco's new line of PMM-900 Series professional monochrome monitors is not only the finest available, but it's available *now*. Unlike other monitor manufacturers, we don't make promises . . . we deliver.

Our special warm, white phosphors produce an exceptionally sharp, bright picture with *900 lines of resolution*. And the foot-candle output is twice that of other monitors on the market.

And only Lenco gives you the unique, plug-in modular chassis that allows you to interchange the five individually shielded circuit modules with any of the 900 Series monitors regardless of CRT size.

Couple that with our *two-year warranty*, underscan and pulse-cross options, a range of cabinet monitors from a 9″ through a 23″, dual 9″ and 12″, 15″ and 19″ rack-mounted models. That's a combination that can't be beat.

So forget about waiting for Brands "A", "B", or "C". Lenco is here with the best . . . *NOW!*

Call or write today for detailed specifications and the name of your nearest Lenco dealer.

LENCO, INC., ELECTRONICS DIVISION

300 N. Maryland St., Jackson, MO 63755, (314) 243-3147

13620 Littlecrest Dr., Dallas, TX 75234, (214) 241-0976 • Post Office Box 301, Atchison, KS 66002, (913) 367-1146

1 Elmwood Lane, Westport, CT 06880, (203) 226-4482 • 2390 Tiffany Circle, Decatur, GA 30035, (404) 288-2080

Circle (70) on Reply Card

EMP protection

continued from page 46

States as shown in Figure 1. Yet, the area could be relatively free from other nuclear blast effects. The EMP field induces large transient voltages which result in high currents in electrical conductors and electronic components. The extent of damage or malfunction caused by these transients depends upon both the transient magnitude and component sensitivity.

The spectrum and wave form of EMP differ from those of any other natural or common man-made sources. The spectrum of potentially damaging EMP energy is broad and extends from low frequencies into the VHF band (100 MHz) as depicted in Figure 2. The time waveform indicates a higher amplitude and a much faster rise time (typically a few nanoseconds) than the fields generated by a nearby lightning stroke.

Due to the difference of spectrum and waveform between EMP and lightning, the normal lightning protection techniques employed by broadcast stations are not sufficient to eliminate the problems caused by EMP. A waveform comparison is shown in Figure 3. **However, EMP protection techniques offer superior lightning protection, which serves as an added incentive for stations to cooperate in the program.**

The first pilot radio stations to be protected against the effects of EMP were KNOX in Grank Forks, North Dakota; KWTO, Springfield, Missouri; and WKZO, Kalamazoo, Michigan. In fiscal year 1977, DCPA provided over $200,000 in federal funds to complete EMP protection for some 59 radio stations including fifty 50-kw stations. This dollar amount included a contract with the Civil Engineering Laboratory (CEL) at Port Hueneme, California, to supervise the engineering and installation of the EMP devices. Don B. Clark, under contract to DCPA, is the project engineer for the CEL. DCPA has tried to protect the highest power stations first, in order to provide maximum coverage for the dollar spent. In fiscal year 1978, some 38 additional stations have been projected to receive EMP protection. DCPA's eventual goal is to protect over 500 stations, which would result in a fully protected station in every local operational area of the EBS.

How does it work?

To accomplish this protection,

continued on page 50

You get only one chance at a live feed.

So put a TerraCom TCM-7 "Miniwave" at the scene.

The TCM-7 is the best performance ENG microwave available anywhere — and the easiest to set up and operate. Field tune to any channel. No reported failures on the first one hundred links delivered. Available in 2, 7 and 13 GHz — as well as all other bands.
That's it — fine reliability, high performance, easy to use, all bands, and tunable frequency. Best price too.

For more information or a demonstration, call Bob Boulio or Stan Sievers at TerraCom (714) 278-4100
9020 Balboa Avenue, San Diego, CA 92123

TERRACOM®

LORAL Corporation

Circle (71) on Reply Card

EMP protection

continued from page 48

several steps are involved: First, EMP specialists from the DCPA regional office obtain cooperation of the station by explaining the program and the benefits to be derived from receiving the protection. The EMP specialist from the DCPA regional office may be a civilian employee of the United States Army Communications Command Facility or the Corps of Engineers Resident Engineer Support Group. (The EMP specialist may be from either agency or a combination of the two, depending upon the DCPA region involved.)

After obtaining cooperation of the station, the EMP specialist conducts a survey to see what is needed to protect the station from the effects of EMP. During the survey, the specialist is accompanied by one or more of the station's engineers. Once this survey is completed, the booklet is sent to Don Clark of the CEL, who reviews the report for accuracy and adequacy. Clark then provides technical advice and/or approval of the engineering evaluation and sends it back to the regional office.

At this time, the regional office forwards the survey to the radio station involved for its approval. Once final approval is obtained from the station, a contract is entered into with the station for installation, and the electronics hardware is then ordered. The EMP specialist delivers the bill of materials to the station, discusses installation techniques with the station's engineering staff, and provides advice as needed. This installation may be done either by contract or in-house personnel at the station, who are then reimbursed by DCPA.

The following major areas within the station are protected: RPUs at the station fallout shelter and local EOC, emergency programming equipment, programming links and remote control equipment, audio processing chain, transmitter, and antenna systems. The basic protective measures involve the power, audio, and RF portions of the equipment.

The present concept for protecting broadcast station components provides for transient limiting protectors, such as bipolar zener diodes to be installed on audio input and output leads. Metal oxide varistors are specified for the power leads of individual units such as amplifiers, limiters, receivers, mixers, and transmitters at the transmitter site. To protect RF circuitry, zero reaction time gasgap-type devices are specified. All protectors are chosen to be compatible with operational circuit voltages, frequencies, and impedance, such that there is no adverse effect on normal operations when overvoltage transients are not present. Figure 4 is a schematic of Los Angeles Radio Station KFI antenna tuning unit and recommended protection.

The Federal Communications Commission is aware of and encourages the DCPA EMP protection program. However, it is the station's responsibility to notify the FCC Broadcast Bureau of the date that the protection devices will be added to the station's equipment. The FCC will normally respond with no objection, but may ask for "before and after" readings of critical points such as base current and monitor points.

Lightning and static

In addition to providing EMP protection, protective measures de-

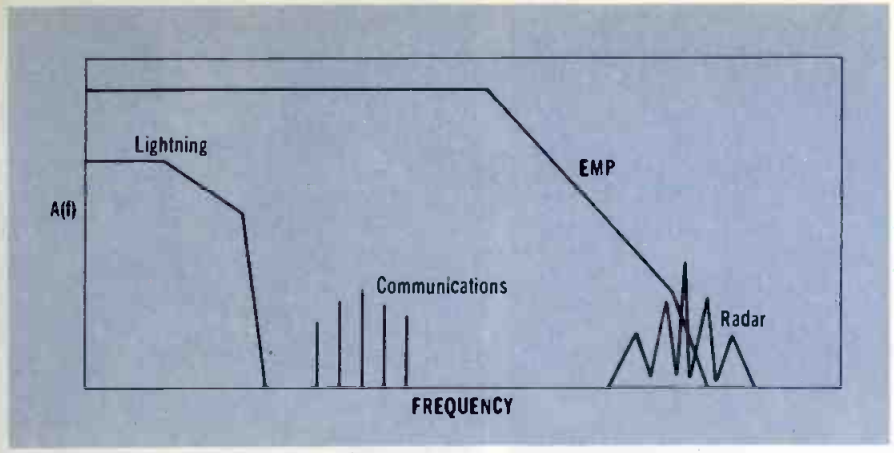


Figure 2 A comparison of EMP with respect to the frequency spectrum.

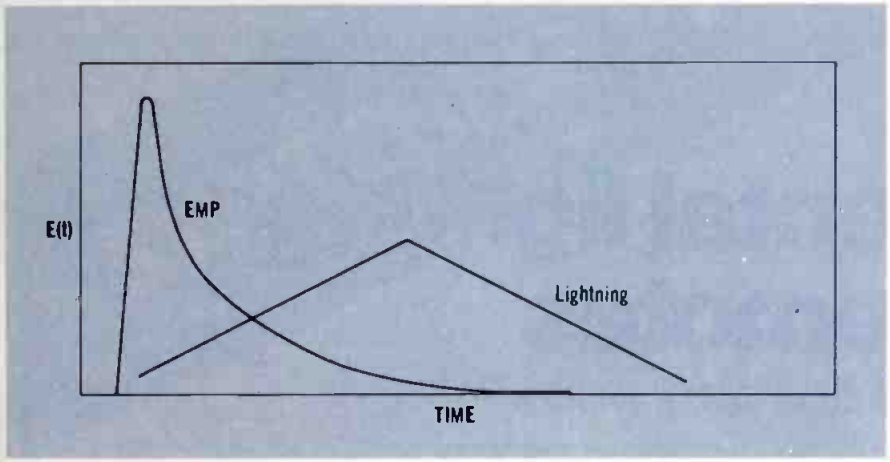


Figure 3 A comparison of EMP and lightning with respect to time and amplitude.

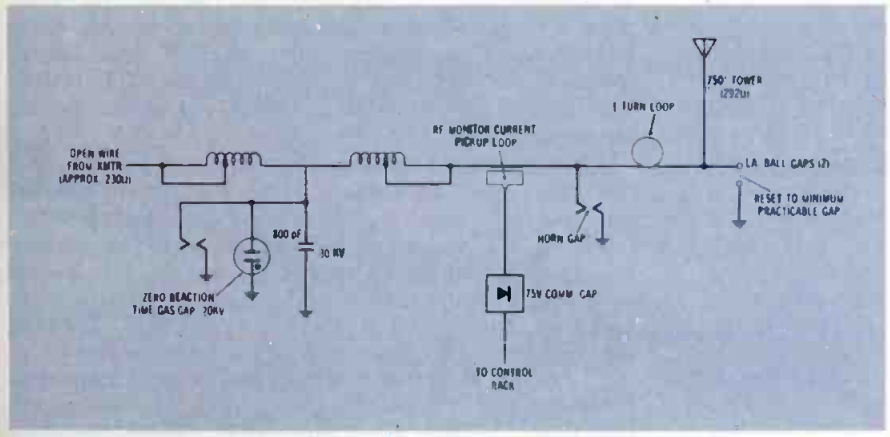


Figure 4 Schematic of antenna tuning unit at KFI, Los Angeles, and recommended EMP protection.

signed for each EBS station should greatly reduce operational problems caused by lightning and static transients induced on antenna circuits. Further, they should eliminate or greatly reduce over-voltage transients induced into the audio signal and control circuits as well as over-voltage transients in commercial power circuit connections.

Due to funding limitations, only those stations that are in the BSPP will be protected by DCPA, but this does not prohibit other stations from obtaining protection on their own.

To receive information regarding EMP phenomena, protection devices, and installation techniques, interested stations should contact the DCPA regional office that serves their area. If a station is not sure which DCPA regional office serves their area, they should contact their local civil defense office. □



Two, one-inch pipe nipples 12 inches long and four, one-inch floor flanges are used to construct the lamp mounts. See text for complete instructions.

Supplemental lighting for ENG remotes

By Marvin Born, WAVE-TV, Louisville, Kentucky

After driving our ENG van several times, I discovered that most news stories occurred at night, in the rain, and about 20 minutes before our 11 p.m. headlines.

I also found that most stories occurred in available darkness, so some form of supplemental lighting was necessary for the viewer to see much of what was going on.

Our truck carries four, 1 kw portable lamps, which with their stands and extension cords, take longer to set up than setting the microwave shot and connecting the minicam. Something faster, brighter, and semi-permanent was needed. Twelve-volt aircraft landing lights were considered, but they were the wrong color temperature and required too much current from the truck's electrical system.

What was needed was a low-cost, weatherproof, 1000-watt lamp which could withstand a mobile environment atop a truck and still maintain correct color temperature for the life of the lamp. In addition, some form of adjustable mounting system was necessary. The generator could only handle about 20 more amps with the air conditioner operating, so only two lamps could be used and they had to be movable atop the van.

The General Electric model OF-500A outdoor floodlight filled the requirements exactly. This lamp housing is available locally at most electrical supply houses or can be ordered. It is aluminum with a drop door front for ease of lamp replacement, and the lens is high-impact plastic. The housing is available with a medium and a wide-angle spread at a cost of approximately $19.00 (less lamp). I suggest use of the medium spread as the light level is increased by two F stops and still gives a 20-foot by 20-foot area of light at 200 footcandles near the van. The housing comes with a threaded shaft for mounting on an AC outlet box. I used the optional flat bracket (cost $4.00) designed for mounting on flat surfaces. The ¾-inch hole in the flat bracket is needed to mount on the following design.

A method of mounting the lights was devised so that two lights could be used to cover the front of the van and the right side, which are my favorite operating positions. One lamp can be used to cover the left side if necessary, while the second covers the front, such as a wreck on the Interstate where you can't turn the van around and must park on the right side. The rear can be covered by the stand lights if necessary.

The mount is simple in design and easy to construct; however, a welder and a metal lathe are necessary. Use two, one-inch pipe nipples 12 inches long and four, one-inch floor flanges (see photos). Cut the nipples in half and screw the nipples in the flanges with a pipe wrench. (You may want to drill the holes first.) Drill and tap a 3/8-inch hole in one side of the nipple. Place the hole one inch from the non-threaded end. There will be only a few threads in the pipe, but that is all that is necessary for now. Thread a square nut on a 3/8-inch bolt (don't use brass) and screw the bolt into the threaded pipe, finger tight. Weld the nut in place to the pipe trying not to get the bolt too hot. I spot welded two corners and removed the bolt. Run a tap through the nut and the pipe. Threading the pipe makes it easy to hold the nut while welding. I tried holding it with a clamp but could not get enough

continued on page 54

Credit is due John Mitchell of WAVE for his help in building the mounts.

6104A

SWITCHER IN A "SUITCASE"

- 12 V.D.C.
- 117 V.A.C.
- INTERCOM
- AUDIO MIXER

- VERSATILE SPECIAL EFFECTS GENERATOR
- FULL SYNC DISTRIBUTION SYSTEM
- EASILY ACCESSIBLE PLUG-IN CARDS FOR MAINTENANCE
- **PHASYNC™** FOR CAMERA PHASING WITHOUT VECTORSCOPE

This console is rugged and reliable. Ship it by air as baggage and it arrives at your destination in perfect working condition. On remotes, it can be handled conveniently by one person. It will withstand all the rough handling and shocks that are inherent in field operations. For convenience it is unbeatable—it unfolds easily into operating position.

The sync distribution system has all pulse drives for five cameras and independent phase adjustors for both horizontal and subcarrier. In addition, there are five black burst outputs for genlock cameras.

Consider the switcher. Here you have full broadcast quality, with FCC blanking and all the features required for a sophisticated field production. The twelve pattern effects generator include circle, square and diamond. In use, it is foolproof and thinks ahead of you; at the end of each operation it automatically gets into the correct mode for the next one. It features wipe key, colorizer, positioner, soft wipe, automatic preview, spotlight and toggle. Effects can be re-entered into mix, and mix re-entered into effects - with full mix/effects preview. Surprisingly all this is done with only two buses. But above all the switcher is a good, clean, stable design with no flash or bounce.

It accepts non-synchronous sources (VTR's) on any input.

The patent pending **PHASYNC™** circuit permits quick color phasing of cameras in the field without a vectorscope, using only the program monitor.

Price $9,500

CROSSPOINT LATCH CORPORATION

316 BROAD STREET SUMMIT, NEW JERSEY 07901 (201) 273-1090

Circle (72) on Reply Card

Supplemental lighting

continued from page 52

current flow to get a good weld. Don't try to use only the threads on the pipe for the final product; they won't hold.

The pipe nipple has a one-inch inside diameter and one-inch OD aluminum stock was used to make the mounts; therefore, they will slide together. Cut the stock into four pieces, each six inches long, and thread 3/4-inch threads on one end of each of the four pieces.

Measure 3½ inches from the other end and turn a groove into the stock 7/16-inch wide and 1/8-inch deep. The bolt which will screw in the welded nut will seat in this groove to lock the lamp in position and to prevent the lamp from bouncing out of the mount if someone forgets to tighten the thumb screw.

Mount the optional bracket on the lamp housing and attach the bracket to the threaded shaft using a large washer and ¾-inch nut. Make it very tight, then drill a 1/8-inch hole through the nut and the threaded part of the stock. Install a stove bolt in the hole. This is an important step. The nut will work loose or someone will just turn the housing without loosening the thumb screw and force the mount to move. (The photos do not show this step as I had to add this later.)

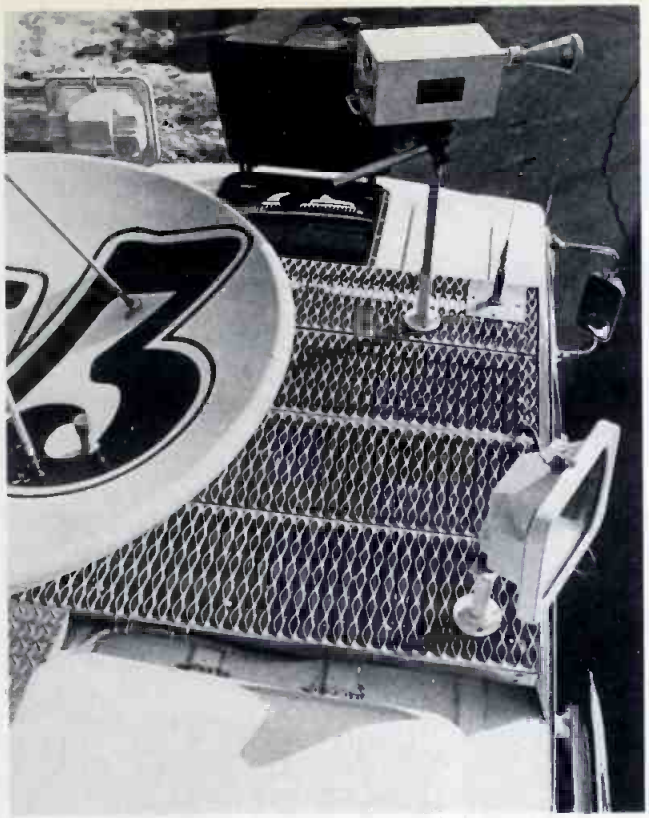
Berkey Colortran used a two-inch thumb screw with 3/8-inch threads on their stand lights. These are perfect for the thumb screws. You will also want to replace the tilt adjustments with thumb screws. Brass bolts can be used and released with a six-inch adjustable wrench if thumb screws are not available. (See the photos for exact construction and assembly. The photos were taken before the lamps were painted for better detail.)

Do not buy lamps with the housing. The housing is rated for 500-watt lamps, but was rated for long periods of usage. The Sylvania FCM 1000-watt 3200D studio lamps fit the housing without modification. We have operated FCM lamps for several months with no overheating problems. These housings don't get as hot as regular studio lights with 1000-watt lamps. The FCM lamps draw about 10 amps each and the 20-amp load presents no problem for a 7500-watt generator as long as both are not turned on at the same time. The generator can handle the microwave equipment, accessory audio and video equipment, heating or air conditioning, and the lights with about a 50-amp load. It is necessary to drop heat or air conditioning when extra stand lights are used.

Mount the four flanges on the truck as shown: two on either side of the front and the third on the right side about halfway back. Bring the AC cord for one lamp up halfway between the side mount and the right front mount, and the second AC cord between the two front mounts. With this arrangement you can move the housings to either the front or side of the van. Mount the fourth flange near the rear of the truck for use with the windowsill microwave unit.

Wrap #12 rubber-covered stranded wire and tie to the underside of the grating on top of the truck. Use a conduit nipple to enter the truck and seal with GE sealer. Use regular AC 20-amp breakers as switches.

Since the aluminum stock comes in a six-foot length, I used a 28-inch piece to make a tripod mount for our windowsill microwave receiver. Make a groove in one end similar to the light mount and smooth the other end with fine sandpaper. The one-inch OD stock fits the pan-tilt head of several brands of heavy-duty tripods. With this arrangement the receiver can use any mount not in use by a light; and, with the 28-inch



With the addition of two 1000-watt adjustable lamps atop the van, one engineer can set up a shot and light it in less than five minutes. The additional lights also provide useable pictures as far as 100 feet from the van.

shaft the receiver can "see over" the air conditioning unit and the lamp housings. It can be removed for transport by loosening the one thumb screw. We have a cable made up with AC, audio and video, just the right length for fast set-up.

The lights will provide 150 to 200 footcandles near the van, which is fine for on-the-spot interviews and stories where the action is in one area. Useable pictures can be had up to 100 feet from the van with only those two lights. As our van is equipped, one engineer can set up a shot and light it in less than five minutes. This frees the other crew members to collect the story instead of setting up equipment. We have left the station at 10:40 p.m. and had a shot on the air by 10:55 p.m. and drove 20 blocks doing it. We were packing up when the other stations arrived. Before the lights were installed on the truck, five minutes were required just to run AC and set up stand lights. The danger of short circuits to staff and bystanders is also removed and there are two less cables to wind up when the shot is finished.

The lights have been used by the film cameras, by the competition, and as general work lights to clean up a large remote; but, there was also one unexpected benefit. The local police departments have nothing to compare with the set-up speed and area covered by our van lights. The van crew has been asked numerous times to bring the van closer to provide light for auto accidents, train derailments, etc. As a result, the police also provided us with a closer look at the action. □

WINS automates news operation

R2-D2, better known as ART, has streamlined the news operation at station WINS, New York City.

News has always been a high interest input for broadcasters, but it comes with a high price. If a station decides to go heavy on the news or switch to an all-news format, cost factors jump to the head of the line. Let's face it, the news format is expensive.

Take WINS, New York City, for example. They had shifts working all day on taping, labelling carts, and editing the AP radio wire. Before they ever got into accounting for the other key people who would collect the local news, along with those who would make the news decisions and those who would air it, they had to find two or three people who would handle the wire news. That's the way they used to do it.

Enter the ART

With costs spiraling upward, especially in the major markets, some automated procedures have provided relief in both the engineering and programming departments of most stations. It was with this in mind that a group of major market broadcasters initiated cooperative meetings over two years ago to tackle what, until recently, has been one of the more highly visible operating expenses in news gathering and handling.

Subscribing to one or more of the news service audio wires is an excellent way of providing not only up-to-the-minute newscasts, but also features and actualities which stations mey incorporate into their own newscasts as a vehicle for more factual and concise reporting.

The problem with this method has been at the local station level where the cost of station personnel involved in retrieving, recording, editing, and dubbing this information into comparatively easy-to-handle cartridge tape form has continued to climb. In All News and other active news operations, as many as three full-time personnel have been employed just to handle this one operation hourly. It became obvious that if one piece of equipment could be designed and implemented to handle this function, the long-term savings could be considerable.

For about the last two and a half years, engineering personnel from Westinghouse Broadcasting's Group W and several of New York's other large broadcasters worked toward development of specifications for an automated system which had the capability of retrieving these features at the rate of one air-ready actuality per cartridge. Early in these meetings, Group W personnel began working independently with the Broadcast Products Division of UMC Electronics. Not only was input toward a possible solution requested, but also the manufacture of a prototype system to fill this need. Early in May, the first system of what UMC says will now be an ongoing product line went on-line full time at Group W's WINS in New York City. It is called ART (Actuality Retrieval Terminal).

The new system

The system consists of 20 Beaucart Type-10 cartridge decks, a common record amplifer, an equalizer for input of the telco line, four silence sensors, a 16-tone touch tone decoder circuit, and a specially designed, computer logic, control sequencer.

Access is given through a control panel which provides three priority override routines for sequencing. Prior to taking any feed, it can not only be predetermined what slot position the system will start from for the upcoming file, but also for subsequent files as well, up to the capacity limits of the system.

This provides maximum walk-away time as well as the ability to plan long-range preventative maintenance programs for the system, since all the decks will be used equally.

The cartridge being recorded and the number of cartridges left which are available for recording are displayed on two front panel digital displays. Through a sophisticated but easily understandable tally light

indicator circuit, station personnel are also kept informed as to the state of each cartridge inserted in the system, including provisions made for any news service aborts, or loss of a feature due to machine malfunction.

An aural and visual alarm circuit also allows notification that the system needs attention for reloading when there are only two cartridges left available for recording. A malfunction indication and automatic system shutdown is also provided for when there are no unused cartridges left for recording. Contact closures are made available for the remote operation of a reel-to-reel, cassette, or other back-up machine to insure never loosing a feature.

Look-ahead and skip functions insure a cut will never be lost due to the system not being fully loaded, or by recording over a previously recorded cartridge that has not yet been retrieved from its respective deck.

At the end of the feed, the system provides air-ready cuts which can be immediately used in the next newscast by either the control room engineer or the newscaster with minimal time and cost expended.

In order to use as little space time as possible in the control rooms' sometimes-minimal playback equipment, a 150-Hz tone is applied at the end of each recorded cartridge to trigger fast forward recueing on playback machines equipped with this feature. This assures the operator in the control room that all of his available playback slots will be clear for new material as soon as possible.

Thanks, R2-D2

While costs certainly are important, it's also true that this kind of machinery does streamline the input side of the new operation. And it probably won't be too long before the wire services offer an accessory that will automatically print the news cart labels! But that's down the line.

Meanwhile, inside Group W, the feeling is that this approach will enhance the reliability of news inputs, because there just isn't much room left for error. And, of course, it will streamline the news operation. Already the system in use at WINS is referred to as R2-D2, which should tell you whose side it's on. □

New! For heterodyne VTRs

a broadcast quality, digital TBC

It's the CVS 516, first digital TBC made and priced to give users of non-segmented, heterodyne VTRs all the proven advantages of modern digital video processing.

The CVS 516 is ideal for ENG, teleproduction, studio VTR backup and much more because it comes with features that, before, you'd find only in TBCs costing up to twice as much.

For example, correction of chroma/luminance delay problems, a 3 dB chroma noise reduction, velocity compensation and color dropout compensation are standard.

So is "Gyrocomp," an exclusive, use-proven CVS memory design that easily handles severe gyroscopic distortions—without breakup.

There's also a broadcast stable, gen-lock sync generator, automatic VTR advanced sync and a built-in completely adjustable processing amplifier.

If all that's not enough, add our optional, moderately priced Image Enhancer/Noise Reducer. This plug-in card substantially reduces luminance and chroma noise and significantly improves subjective resolution. And, to tame even the wildest instability, you can add our optional 16 line window.

Simple operation is another plus for the CVS 516. Front panel controls give you total mastery of your video signal. Each control also has a preset unity position to give you a consistent starting point for all your tapes.

All this, and more, is contained in a package that weighs only 25 pounds, is only 3½ inches high and uses only 175 watts—major advantages with today's increasing emphasis on ENG and field production.

So, to give your heterodyne productions the quality they deserve, get the one digital TBC made and priced to do the job—the CVS 516. For full details and/or a demonstration, contact your authorized CVS Distributor or CVS. And ask for our new booklet about the basics of digital time base correction. It's free.

CVS Consolidated Video Systems, inc.

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

For Technical Data Circle (78) On Reply Card
For Demonstration Only Circle (79) On Reply Card

station-to-station

Improving the telephone-interface system

By Robert Raffaele, Physics Department,
State University of New York at Albany

Some time ago, station WQBK in Rensselaer, New York, began using a telephone-talk format, and I immediately had the job of improving the telephone-interface system. We had been using a direct connection from the telephone-company-provided QKT connector to the station's console. This proved to be inadequate as soon as we desired a two-way system. The first thing that I tried was the most obvious: the use of hybrid transformers.

A telephone system of some sort was required because of what we wanted to accomplish when we interfaced our equipment with the telephone company's. We wanted to receive signals from the telephone line onto a variable attenuator on the station's console; we also wanted to send signals on the phone line; but we did not want the signals being sent to be received back into the console via the variable attenuator which is connected to the telephone line for reception.

A hybrid telephone system works quite simply, as is explained in Figure 1. The telephone line is connected to terminals 1 and 2 of T1. A signal which the station wishes to receive from the telephone line then appears at terminals 3 and 4 of T1. Terminal 3 of T1 makes a direct connection with terminal 1 of T3, which feeds the station's console. Terminal 4 of T1 is connected with terminal 2 of T3 through the

continued on page 60

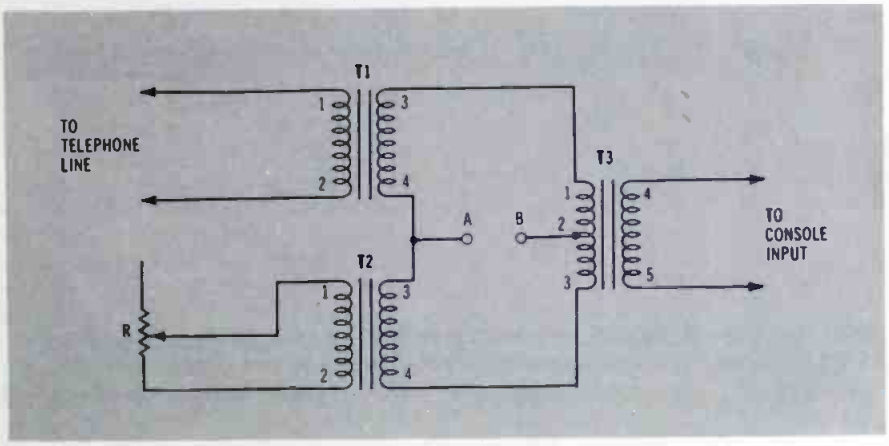


Figure 1 Basic hybrid telephone circuit, as described in text.

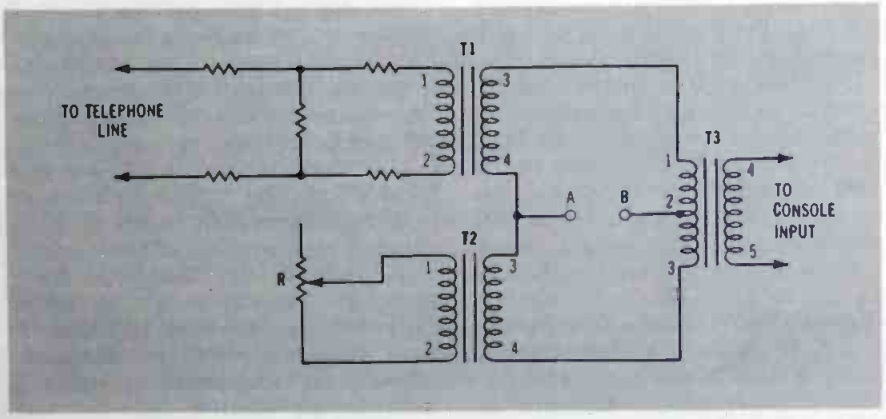


Figure 2 Hybrid telephone system, with resistive attenuator added to help achieve balance.

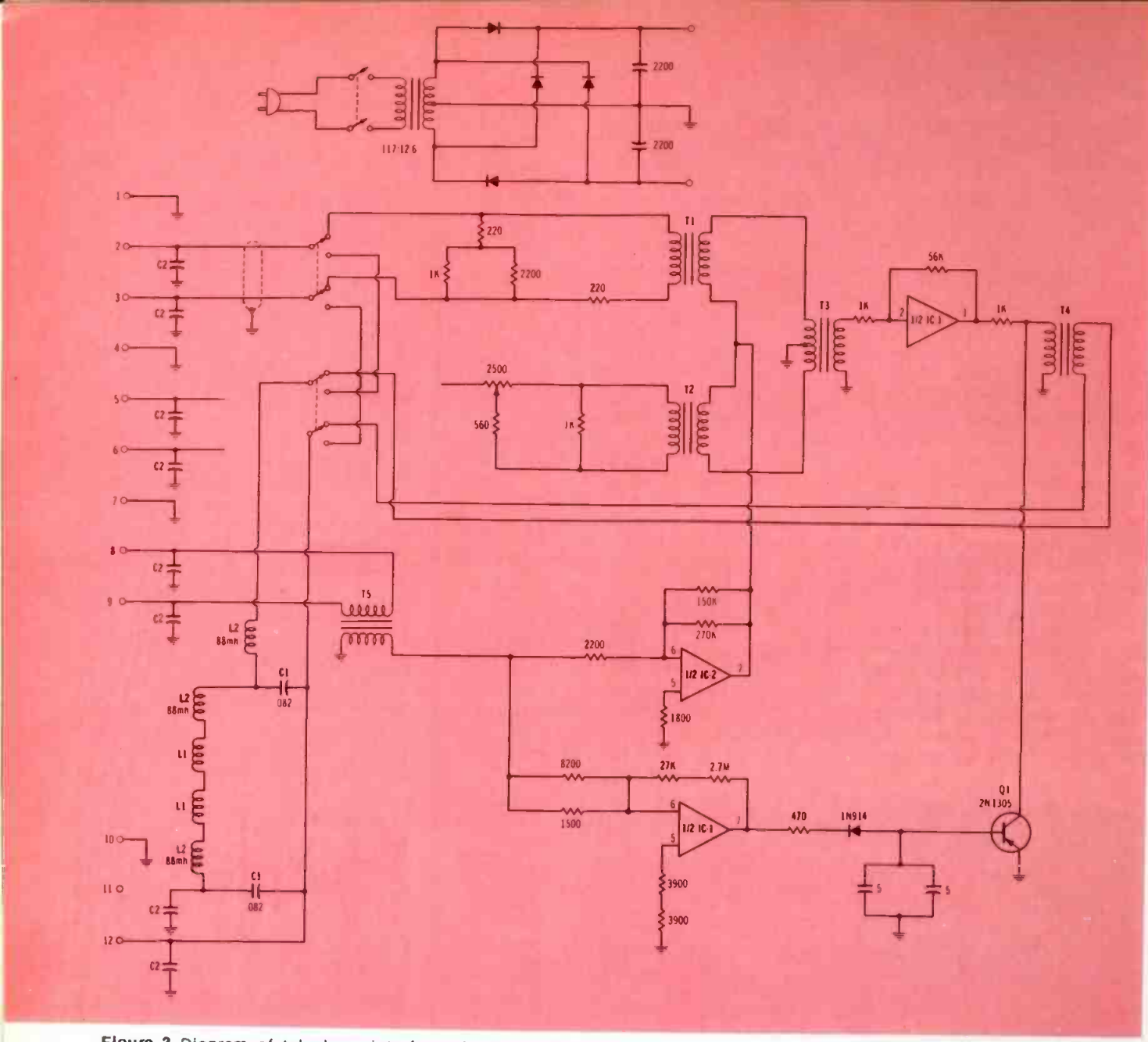


Figure 3 Diagram of telephone-interface circuit exactly as it was constructed for WQBK. C1, C2, L1 and L2 have been included for RF filtering. T1, T2 and T3 are Radio Shack DI-728's; but this is not critical, as long as T1 and T2 are identical.

Station-to-Station

continued from page 59

low-output impedance of an audio amplifier connected at A and B. Also, terminal 4 of T1 is connected through T2 to terminal 3 of T3. Both connections put current in the same direction through T3 in proportion with the signal coming off the telephone line.

A signal, typically from microphone circuitry, is sent down the line by connecting it to the input of an amplifier whose output terminals are at A and B. A signal applied at A and B puts current in two different paths in the hybrid circuit. One such path is through the winding of T1 that terminates in terminals 3 and 4 and through the half-winding of T3 that terminates in terminals 1 and 2. This current-path puts the signal on T1 and subsequently down the telephone line.

The other path is through the 3-, 4- winding of T2 and through the 2-, 3- half of the 1-, 2-, 3- winding of T3. Resistance R, connected to T2, must be adjusted to equal the characteristic impedance of the telephone line. The signal which appears at A and B is sent through the 1-, 2- half of the 1-, 2-, 3- winding of T3 in a direction opposite to that in which it is sent through the 2-, 3- half of the same winding.

Since the currents through the half-windings are equal and opposite, the signal applied at A and B never appears at terminals 4 and 5 of T3. Therefore, we are sending a signal down the telephone line and we are extracting a signal from the line without ever letting the signal being sent go to the same input as the signal we are extracting from the telephone line.

This works well in theory but not in practice. The biggest problem is that it is impossible to set R to a value equal to the characteristic impedance of the telephone line, since this impedance is frequency-dependent. In my experimentation I have placed a resistive attenuator between the telephone line and T1, as shown in Figure 2. This has the advantage of making the telephone line more resistive and less fre-

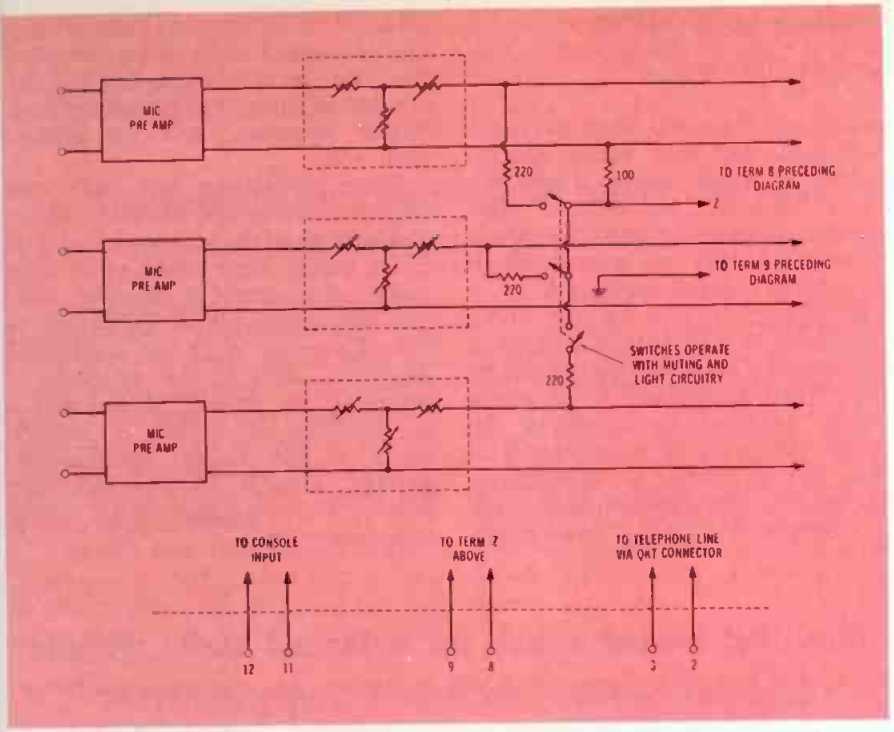


Figure 4 Telephone interface system, exactly as it was installed at WQBK.

quency-dependent as seen by T1. This has the disadvantage of reducing the signal received from the line and requiring a stronger signal (that we are sending) sent through T1. These disadvantages oppose just what we try to accomplish with a hybrid circuit.

I think any engineer wishing to use this system would have to decide for himself what is the best compromise between apparently-constant phone line impedance and good levels. We at WQBK used the best compromise we could find empirically for values in our attenuator. Then the limitations inherent to the hybrid system in this form became unbearable. We were unable to send a loud signal back down the line and the isolation between what we were receiving and what we were sending was not good enough.

A little more work in the lab led to the system which WQBK is now using. Since isolation was the biggest problem, I designed a circuit which used the presence of the announcer's voice to activate a transistor switch which placed a relatively low resistance across the output of the hybrid system, almost shorting it.

Figure 3 shows the telephone interface circuitry exactly as it is being used at WQBK. I have described most of this circuit. The switch which shunts the output is transistor Q1, a 2N1305, and its associated circuitry. Not mentioned in this article but shown in Figure 3 are the amplifier which immediately follows the hybrid portion of the circuit and the switching arrangement designed to completely bypass this interface circuitry. The operational amplifiers are dual 741Cs. The power supply is shown in the circuit, but the normal procedure of not indicating power connections on integrated circuits is followed.

Because of how good this telephone system sounds on the air and because many other engineers have tried to emulate it, this particular circuit is responsible for the many compliments I have received from colleagues since putting it into use.

De-popping audio edits

By Ed Portzline, Audio Technician, WQLN, Erie, Pennsylvania

At WQLN our main editing machines are a pair of Ampex AVR-2's. However, we encountered a problem: every time an audio/video or audio-only edit was done, a disconcerting "pop" was introduced into the program audio at the edit point.

After consulting Ampex it was found that since the same head is used for audio record and playback, this "pop" resulted because of a

continued on page 62

Station-to-Station

continued from page 61

switchover transient from playback to record, and was within specifications; in other words, it was entirely normal. As anyone with experience with this problem knows, however, it may be normal but it sure doesn't sound very good.

So after having tried just about everything to eliminate this noise, I discovered a small device put out by SAE. The SAE 5000 is a home stereo device designed to eliminate the clicks and pops of scratched records. When I went to investigate, this feature was demonstrated to me on a record that had a screwdriver taken to it. Everyone knows what that record should have sounded like, but the 5000 took those clicks out and left the program untouched. Rather amazing, and for around $200, too.

After purchasing the 5000, the results on videotape were excellent. The edit pops disappeared and you could finally hear what your tight audio edit actually sounded like. The only drawback to the system is that because it is an outboard device, a dub of the program is necessary to "de-pop" it. But this is no problem as a dub is usually made to add slates, countdowns, supers, etc. If anyone has any problems or questions I'd be happy to answer them.

Simplified loaded switch for balanced audio circuits

By William Oringderff, Broadcast Audio Consultant, San Francisco, California

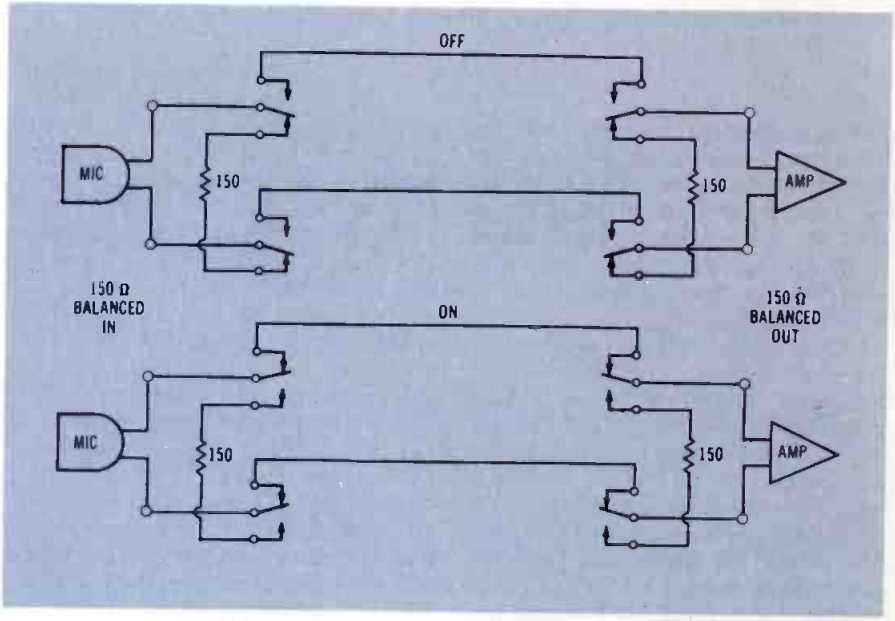


Figure 1

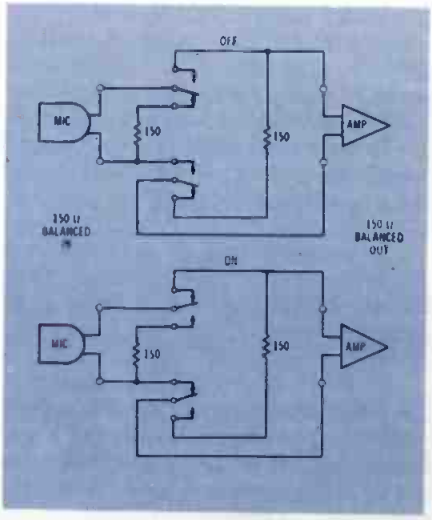


Figure 2

It is well known that a balanced loaded switch which terminates a balanced audio source and a balanced input with a load resistor in the off position is a good design for any switch used for switching audio to minimize level changes and switching transients. However, the cost of 4PDT switches to do this in a conventional way, as shown in Figure 1, can be prohibitive.

What is apparently not well known to constructors and console manufacturers is the simplified improved circuit shown in Figure 2, which uses a DPDT switch to perform the same electrical function. Obviously, this basic circuit can be used for any audio transmission line by changing load resis-

tors to the proper value.

As you can see, the input and output are properly terminated and balanced at all times, and reliability is improved because the audio signal now travels through half the number of contact closures as before.

Contending with unbalanced audio channels

By Scott Roberts, Chief Engineer, KFMF, Chico, California

One of the more nagging problems stereo station engineers must contend with is unbalanced left and right audio channels. I wanted a quick and easy way to measure each audio level under its normal 600-ohm load without the cumbersome patch cords, clip leads, and terminating resistors.

I finally arrived with the idea of taking an old patch cord and removing the end plugs. Take the plug, open it up, and in place of the wires, carefully solder a ½W flameproof resistor. It may be necessary to experiment with the best placement to prevent a short. Reassemble the plug. You now have a patch plug with internal load resistance.

When inserted into a patch panel, it is then possible to measure the audio off the end of the plug at the two Phillips screws, under a simulated 600-ohm (or anything else) load.

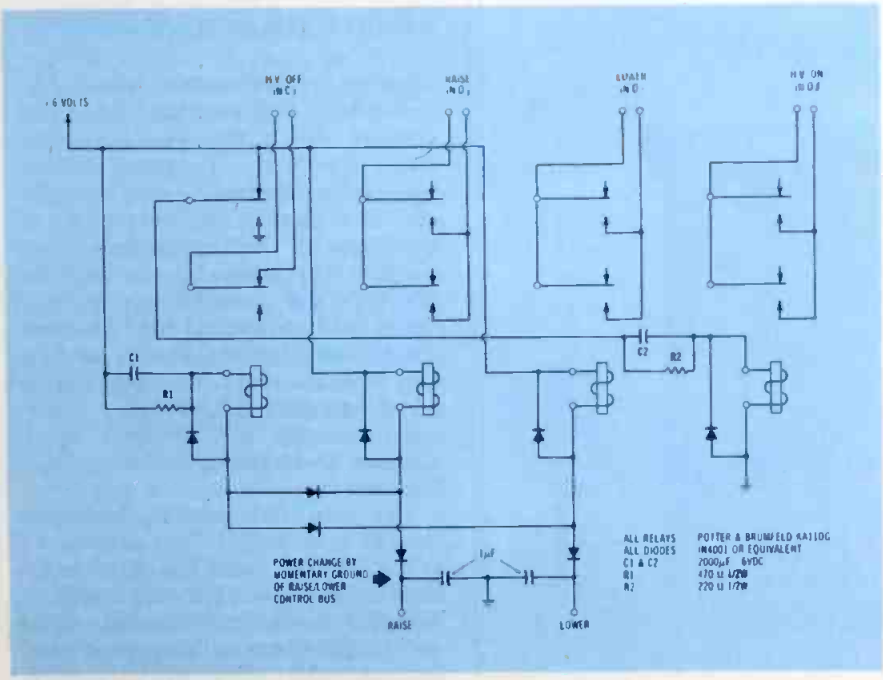
Changing power with one control function

By Russ Mundschenk, Chief Engineer, WRAW, Reading, Pennsylvania

If your standard broadcast transmitter is of the type that requires removal of high voltage before power change, this circuit will provide instantaneous power change with the application of only one control function. For stations operating with a dial-type remote control, this circuit can reduce carrier off time at power change time from 15 seconds to less than ¼ second.

All relays are normally in their non-energized state until the application of a ground to either the raise or lower control bus. At this time, the HV off relay pulls in, discharging C2 to ground. The HV off relay then drops out again after being energized for a time constant determined by the R1/C1 network. C2 charges to VCC and pulls in the HV on relay for a period of time determined by C2/R2. During this time, either the raise or lower relay has been pulled in, and will release with the release of the raise or lower control ground.

This circuit has been used successfully with a Rust Communications remote control unit and Gates BC-1H1 transmitter for three months. Different values of R and C may be calculated for different resistance relays and/or control voltages. □



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

Certification exams scheduled for October

As a result of the interest in the SBE Certification Program expressed at this year's annual meeting, the examinations will be given again in mid-October.

All applications for the October exams must be received in the national office by September 1. Anyone wanting to take the examination should request a copy of the complete program and application forms. Included in this is a list of SBE chapters, a list of suggested study materials, and sample exam questions for each level.

The address is Certification Secretary, Society of Broadcast Engineers, P.O. Box 50844, Indianapolis, IN 46250.

Lost applications

Mary Brush in the national office has been tracing all lost applications, and has compiled a list of applicants that do not have an address on file. These include Barry Albright, Daniel Cervelli, Robert Dahl, John Laughmiller, Raymond Mattinson, Charles Murray, Larry Reynolds, and Peter Zaiko. These persons should contact Brush as soon as possible, either by writing to the above address or calling (317) 842-0836.

New Chapter

The society announces the addition of another new SBE chapter. Chapter 52, Columbus, Ohio was organized under the direction of William Orr, charter member of SBE and former member of the board of directors. The society congratulates Bill for his accomplishment and is happy to welcome Chapter 52 aboard.

Note

The society also reports that organizational plans are beginning in some other areas of the country toward forming SBE chapters. Austin, Texas; Nashville, Tennessee; Tulsa, Oklahoma; Salt Lake City, Utah; La Crosse, Wisconsin; and St. Louis, Missouri are all planning organizational meetings. Anyone interested in attending any of these meetings may write to the national SBE office for further information.

CHAPTER REPORTS

Chapter 1—Binghamton, New York

The May 18th meeting was a joint meeting with Chapter 22 in Syracuse, New York. The guest speaker was John Theimer, engineer-in-charge of the Buffalo field office of the Federal Communications Commission. He talked about field inspections and demonstrated some of their field monitors. Mr. Theimer emphasized that the FCC is anxious for broadcasters to know more about how they operate.

Chapter 2—Northeastern Pennsylvania

The June 12th monthly technical session was held in the studios of WVIA/TV/FM in Pittston, PA to hear John Kowalchik, an engineer with RCA's solid-state division, speak on "Applications of Microprocessor Control." Mr. Kowalchik, also a

former Chairman of our local SBE Chapter, recently was awarded first prize in a corporate-wide RCA contest on microprocessor design applications. His design was centered around the RCA COSMAC CDP 1802 Microprocessor. Mr. Kowalchik described the use of the microprocessor and auto patch system for amateur radio.

Chapter 16—Seattle, Washington

The May meeting was held in conjunction with our Northwest regional convention. The May 16th meeting was followed by a luncheon with guest speaker Dan Evans discussing "Utilization of Media in Higher Education."

Chapter 22—Central New York

This May 18th joint meeting with Chapter 1 featured an excellent program by John Theimer, engineer-in-charge of the Buffalo field office of the FCC. A tour of the VHF monitoring van was also featured.

Chapter 24—Madison, Wisconsin

The May 31st meeting was held in the Fire Department headquarters of the city of Madison. The meeting featured a tour of the city's new Central Dispatch Facility, conducted by Jim Crooks, coordinator of communications facilities for the city. This was the last meeting for the season; meetings will resume in September.

Chapter 26—Chicago, Illinois

The May 11th meeting was held at Telemation Productions in Glenview. Mr. Dennis Fraser, vice president and general manager of NEC America Broadcast Equipment presented a program on "Digital Television Techniques—A State-of-the-Art Report." He had, on demonstration, several of the new digital devices including NEC's "Telephone Video System."

Chapter 28—Milwaukee, Wisconsin

The May 23rd meeting was held in the auditorium of WTMJ. Norm Parker, vice-president of Motorola, and Charles Merrick, senior project engineer for Motorola's AM stereo system, presented a program on AM stereo. By means of overhead projector, Mr. Parker explained the basic types of AM stereo systems that have been proposed, and the strengths and weaknesses of each approach.

Chapter 38—El Paso, Texas

KDBC-TV studio was the location of the May 9th meeting. Membership approved the awarding of free SBE pins to each member and require wearing at meetings and all other SBE functions. Members not wearing pins will be fined.

Chapter 39—Tampa Bay Area

The May 15th meeting was a field trip to Florida Film Center, Inc. in Tampa, conducted by Chuck Harder, general manager of the Center. Florida Film Center can do an entire network film production under one roof. They are a total-film house for TV.

Chapter 41—Central Pennsylvania

The community room at WHP stations in Harrisburg was the location of the May 18th meeting. Wally Warren of RCA gave a slide presentation on FM exciter development including the new BTE-115 exciter and stereo generator. He also discussed RCA's new digital overshoot corrector.

Chapter 43—Sacramento, California

The May 23rd meeting was held in studio "C" of KXTV. The guest speaker was Roy Carpenter of Lightning Elimination Associates of Downey, CA. LEA is a pioneer in

continued on page 66

SBE

continued from page 65

the field of lightning prevention.

Chapter 45—Charlotte, North Carolina

The program for the May 8th meeting was given by Bill Gray of Tektronix. Bill demonstrated some of the latest equipment offered by Tektronix, including an oscilloscope made specifically for servicing digital equipment.

Chapter 46—Baltimore, Maryland

The regular luncheon meeting was held May 18th. Wally Warren and Nick Hudak of RCA gave a lecture with slides on FM exciter systems, stereo generators and SCA generators. Also discussed in detail was RCA's new DOC processor (Digital Overshoot Compensation) as a cure for the FM modulation overshoot.

Chapter 49—Central Illinois

For this special meeting, April 25th, the chapter was the guest of International Tapetronics Corp., Bloomington, IL. Andy Rector, vice

Help!

Anytime you have a question about your subscription to Broadcast Engineering, please include a mailing label ensure prompt service on your inquiry.

Change of Address

If you're about to move, please let us know approximately eight weeks before the move comes about. Simply affix your present label here, and carefully print the updated information below.

AFFIX LABEL HERE

Please Help Us to Serve You Better

Broadcast Engineering
P.O. Box 12901
Overland Park, KS 66212

Name _____
(Please Print)
Employer _____
Address _____
City _____ State _____ Zip _____

Eden, WWJ-TV, 622 Lafayette Blvd., Detroit, MI 48231; (313) 222-2647.

MISSOURI, ST. LOUIS—Bill Martin, RCA, Suite 340, Noah's Ark, St. Charles, MO 63301; (314) 946-7755.

OKLAHOMA, TULSA—Len Ballard, Swanson Broadcasting, 1502 S. Boulder, Tulsa, OK 74119; (918) 582-6195.

TENNESSEE, NASHVILLE—Walt Hairston, WMAK Radio, 810 Division Street, Nashville, TN 37203; (615) 256-6556.

TEXAS, AUSTIN—Mike Wenglar, KVUE-TV, 3201 Speck Avenue, Austin, TX 78766; (512) 459-6521.

TEXAS, DALLAS—Jeff Bixby, Rockwell International, 1200 N. Alma Road, Richardson, TX 75081; (214) 996-5424.

UTAH, SALT LAKE CITY—Donald Lefebvre, TeleMation, P.O. Box 15068, Salt Lake City, UT 84115; (801) 972-8000.

VIRGINIA, NORFOLK—Doyle Thompson, WTAR Radio/TV Corporation, 720 Boush Street, Norfolk, VA 23510; (804) 446-2719. □

president of marketing, assisted by John Abdnour and members of the engineering and sales staff, discussed and demonstrated the new ITC 1K Cartridge Machine. This is in the final stages of engineering development and the discussion period was beneficial to our members and to ITC, allowing their personnel to get the reaction of engineering personnel who will be installing, maintaining and operating the machine when installed in stations.

Chapter 50—Fort Collins, Colorado

The May 1st meeting's program was presented by Bob Botos, service engineer at Hewlett-Packard. He gave a short seminar on "RLC Measurements."

Chapter 51—Tri Cities, Washington

The May 4th meeting had no program because numerous business matters were discussed relating to the chapter plus ideas regarding future programs.

SBE forming chapters

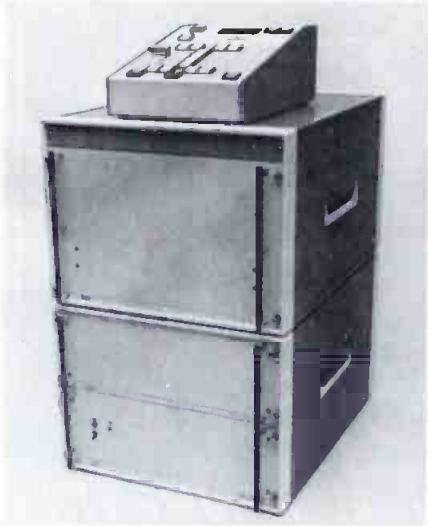
FLORIDA, MIAMI—Jay Mathis, WPLG-TV, 3900 Biscayne Blvd., Miami, FL 33137; (305) 573-7111.

MICHIGAN, DETROIT—Leonard

new products

Broadcast disc recorders

Oktel Corporation recently introduced two compact, low-cost, direct-color broadcast disc recorders offering extended head/disc life.



The Oktel BDR400 slow-motion broadcast disc recorder includes a CCD time base corrector and uses rigid disc analog recording technique. The slow-motion unit is available as a single-channel unit with 30-second recording capacity for $36,000, or with a dual-channel option for an additional $2,000. This option also has a "save" feature to permit retention of one segment while another is being recorded. The machine features continuously variable slow-motion forward and reverse, together with single-field record, field-skip recording, and fixed slow-motion playback rates. An electronic elapsed-time indicator with two cue markers and programmed "play to cue" is a standard feature.

The BDR300 slide file recorder, which has a 1200-frame storage capacity, provides full vertical resolution. The electronics of the BDR-300 is similar to the slow-motion recorder, though configured for slide storage. The unit features a programmable address which will move the heads to any track with a maximum access time of 2.6 seconds. Two buffer channels are available to provide program continuity. Using the buffer channels in conjunction with the programmed sequencer, the operator may shuffle all 1200 slides without degrading signal to noise.

Circle (133) on Reply Card

Head refurbishing

At the NAB convention, *Videomagnetics* of Sunnyvale, Calif., reported excellent interest in their head refurbishing service.

As an example, they offer RCA and Ampex users who have not tried their service a first-time cost of $895; after the first refurbishing the cost is $825 for the same head.

Videomagnetics' warranty is 25-hour no charge, 200 hours pro-rated.

Circle (80) on Reply Card

ENG/EFP camera

Designed for use as either a lightweight, fully self-contained ENG camera or broadcast-quality field

continued on page 70

NRBA '78

The Scene: San Francisco
The Subject: Radio Engineering
The Action: Intense

From two exhibit halls jammed with the latest in equipment and services, to meeting rooms where pros trade outlooks, insights and arguments, to busy hospitality suites and impromptu corridor conferences, the subject is radio and only radio. And the involvement is intense.

It's NRBA's Annual National Radio Broadcasters Conference and Exposition, and it's coming up in San Francisco September 17-20.

Radio engineering's big event!

Bigger than any other all-radio meeting anywhere, anytime, the annual NRBA convention probes radio from every point of view with a special focus on the challenge of engineering in radio today.

Attendance records are shattered year after year because radio men and women from coast to coast know this is the one industry meeting a year they can't afford to miss.

By and for radio people.

What makes the NRBA convention so productive? Simple. It's conceived, planned and run *by* broadcasters *for* broadcasters. NRBA is a shirt-sleeves, volunteer organization of working men and women who are dedicated to the radio business — and this convention shows it.

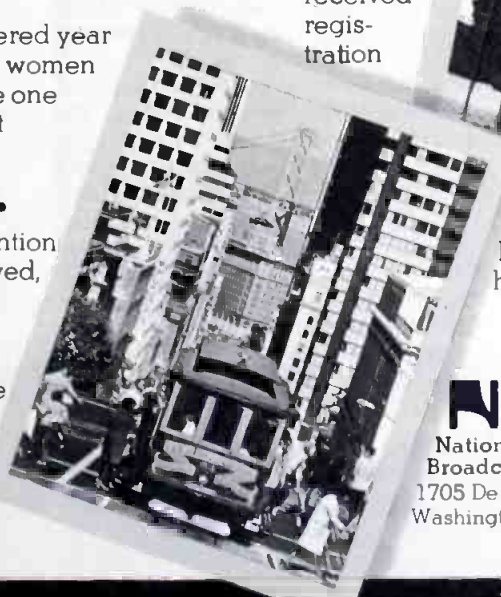
With the emphasis in small give-and-take workshops on new methods, new concepts and new technology, you'll gather information, inspiration and ideas that will pay off for you right away whether your station is big or small, AM or FM, urban or rural.

Windy speeches, wordy presentations and mutual admiration ceremonies are out; no-nonsense results-oriented working sessions are in.

Enjoy San Francisco, too.

NRBA convention headquarters in the spectacular Hyatt Regency Hotel in San Francisco's Embarcadero Center is the perfect jumping-off point for visits to the attractions of one of America's favorite cities.

Join America's radio men and women in America's No. 1 radio event — NRBA '78. If you haven't already received registration forms, call or write NRBA now to assure preferred hotel accomodations.



NRBA
National Radio Broadcasters Association
1705 De Sales Street NW, Suite 500
Washington DC 20036 (202) 466-2030

WE'RE FOR RADIO.

FIFTH ANNUAL NATIONAL RADIO BROADCASTERS CONFERENCE AND EXPOSITION, SEPT. 17-20, 1978 HYATT REGENCY EMBARCADERO, SAN FRANCISCO

Circle (26) on Reply Card

new products

continued from page 68

production camera, the MNC-71CP from *Cinema Products* is well-suited for television industry needs.

Use of LSI microcircuits reduces the number of individual components in the camera, resulting in a more stable performance and lower power consumption, according to Cinema Products.

For easy maintenance, the camera sideplates open to expose all internal circuit boards without requiring the use of a module extender; and, the removal of six screws permits access to the pickup tubes for quick replacement (even in the field).

Options and features include high-transmittance prism optics; 3-tube RGB system with ⅔-inch tubes.

Amplifier

The MS-105 is a utility amplifier from *McMartin Industries* designed for small sound systems requiring one microphone and one program source. As many as 10 speakers (tapped at ½ W) may be driven from the 70.7-volt output or a single 8-ohm speaker may be driven to 5 watts.

The MS-105 unit features a low-impedance microphone input, built-in dual electronic mute, internal thermal limiting, dual-balanced IC output stages, and power supply limiting to protect the ICs.

Screw terminal output termination allows for connection of 8 ohm, 25- and 70-volt outputs. The output stage utilizes two integrated circuits connected in a balanced bridge configuration to distribute the heat uniformly over two output devices. The circuits are protected with thermal cut-out and will shut down if the temperature exceeds a safe upper limit.

Circle (81) on Reply Card

1-inch helical recording

The BVH series from *Sony Broadcast* offers the SMPTE Type C standard 1-inch tape machines. The helical scan VTR features BIDIREX, which gives full bi-directional search capability in both shuttle and jog modes; this means 100% post-production creative freedom, with all the ease and flexibility of 35mm film techniques. The BVH-1000 and

The BVH-1000 and portable BVH-500 provide local programming

capabilities such as creating documentaries, taping commercials, and then going on-air without converting to another format.

Panoramic production is achieved with economy, smaller size, lower maintenance costs, high-fidelity audio tracks, and color framing.

Circle (82) on Reply Card

Videotape recorder

Ampex's VPR-2 helical videotape recorder retains the features of the VPR-1 while meeting the SMPTE Type "C" standard. The VPR-2 is designed for professional broadcast, CCTV, and post-production users, with capabilities for continuous slow-motion and still-frame.

A variable-speed shuttle control also provides the user with continuous control in full fast forward through rewind.

Advanced editing features and transient-jogging have also been incorporated in the VPR-2. Lockup time is essentially instantaneous, with a broadcastable picture the moment "play" is pushed, when equipped with the AST-system accessory. A secondary auto tracking capability utilizes AST to identify video tracks accurately, even without the control track, eliminating temporary loss of control track.

In addition to AST, other options available on the VPR-2 include a video sync channel and three full audio channels. The VPR-2 comes standard in a rack-mounted configuration. An available portable case allows the unit to operate in a stand-up position for table top use.

Circle (83) on Reply Card

Video projector

The multi-standard color television projector GRETAG 5170, another in Conrac's Eidophor line, allows the projection of television

continued on page 72

new products

continued from page 71

pictures measuring up to 9 x 12m in dark locations, or 6 x 8m when the ambient illumination is only slightly reduced.

Live events can be shown on large screens with signal sources from closed-circuit color TV; VTRs; telecines; professional TV receivers; and graphical data and character generators with TV compatibility.

The 5170's features combine for a projector unit, an electronics unit with remote control, and a rectifier. All three units are mobile, being fitted with casters. Long connection cables are provided, and the installation of the three units can thus be readily effected in accordance with any constraints resulting from the particular configurations of a hall or projection booth.

Circle (84) on Reply Card

CP transmitter

The solution to broadcasters' concern over the cost and inconvenience of building transmitter/antenna facilities for CP is the *Harris Corporation's* efficient, low-cost Cyclotran system.

The Cyclotran system, which requires about the same floor space as 50-kW transmitters, includes the BTD-100H3, 100-kW TV transmitter; the Harris CPV, CP antenna; and a central control cabinet. Using only six tubes, the BTD-100H3 features solid-state IPAs. This enhances reliability, reduces tuning adjustments, and results in the unusually compact cabinet configuration.

The BTD-100H3 incorporates such state-of-the-art features as Harris' transversal sideband (TSB) filter; IF modulation; true linear operation of power amplifiers; and solid-state visual and aural exciter/modulators to provide good color performance and sound fidelity.

Circle (85) on Reply Card

Editing system

RCA Broadcast Systems' new AE-6000 time code editing system, designed for RCA TR-600 videotape recorders, utilizes microprocessor controls to add flexibility while simplifying the editing operation.

Through the use of microprocessor technology, machine control has been automated so that editing speed is increased, artistic options expanded, and editing time reduced. The AE-6000 features continuous automatic assembly, switcher control memory, CPU, graphic CRT display format, and simple yes/no decision making.

Continuous automatic assembly permits the operator to make, store, alter, preview and execute edit decisions for an entire program of events at once. The total editing history for the project can then be stored on the system's mini floppy discs for re-editing in the future.

The AE-6000 is capable of controlling up to eight TR-600 VTRs. One TR-600 can be used for recording and seven for playback; or, for two edited masters, two units can be recording machines and six playback.

Circle (86) on Reply Card

Audio distribution system

The ADM DA16, an audio distribution system from *Audio Designs and Manufacturing*, incorporates a new design approach. Each amplifier is a one-in, six-output plug-in card with +24 dBm input and output capability.

The input is transformer coupled, and each of the six outputs is individually transformer isolated. Amplifiers have individual front-panel gain adjustments. Noise level is ultra low, and distortion is less than .1% at +24 dBm.

Up to six DA16 amplifiers can be housed in the CH20 rack frame, which includes a redundant power supply with automatic changeover.

Circle (87) on Reply Card

Stereo mixer

The Centurion II 12-mixer stereo console is part of the *Cetec Sparta Group*. It is functional, compact, and will be adaptable to AM stereo when it arrives.

Twelve mixers; 36 inputs; one or two extender panels of six mixers each (to a maximum of 24 mixers and 72 inputs); rotary or slide pot controls (or both); and solid-state construction are featured. The Cetec Sparta line accommodates multiple choices in equipment and studio layout, such as Sparta's line of turntables, tape carts, and remote-control equipment.

Circle (88) on Reply Card

Transmitter

The *Marti* STL-8 transmitter specifications point to stereo cross talk at -65 dB; noise at -65 dB or less; response at ±0.5 dB 30-15000 Hz; and distortion at less than 0.5%.

Featuring all solid-state construction, direct FM modulation, and modular build, the STL-8 has a built-in test meter, dual-channel stereo STL, and single-channel AM STL or inter-city relay.

Circle (89) on Reply Card

Preamplifier/amplifier

Farinon has introduced a preamplifier for 2 GHz range and a power amplifier for television broadcasters.

The 60576 RF preamplifier is designed for use with low-gain antenna systems, particularly those found in ENG/EJ applications. The weatherproof, pressurizable construction allows the unit to be mounted directly at the antenna location, establishing a receive system noise figure of 6 dB or less while providing 19.5 dB of gain.

Features include combine filtering, thin film amplifiers, isolator coupling, and DC powering.

The 60515 RF power amplifier is used in a microwave transmission system to provide 20 watts of output power in the 2 GHz band. The unit provides self-contained metering and alarm circuitry. Metered functions include amplifier current, amplifier power output, and DC operating voltage. Provision is also made for the metering of external voltages and currents. Internal alarm functions include low RF power output (-3 dB) and fusing. A form "C" summary is available for external alarm interconnection.

Circle (90) on Reply Card

Identification display

Studio Tape Exchange's Video Source Identification Display provides an electronic insert in each TV monitor screen to indicate the source of the picture on that monitor. The insert occurs in a rectangular black background keyed into the video signal. The display dimensions and location on the screen are adjustable.

In the simplest model, a keyboard allows new identifying legends to be provided quickly as monitors are reassigned to different video sources. Similarly, a replacement monitor may be identified in the event of a failure of an operating display. In a more sophisticated version, input from the computer controlling the routing switcher automatically reassigns video source identification to the appropriate monitor screen as the station's equipment configuration is rerouted among the various studios.

Since the identification video is inserted only into the monitor feed, there is no danger that it will appear on the air. The digital data which produces the display may be fed via an audio pair common to all displays, or inserted into the video coax without affecting the picture content.

Circle (91) on Reply Card

Color television camera

Marconi Communication Systems' new Mark IX cameras, with common control unit and a host of optional facilities, are suitable for studio/drama production and outside broadcasting; they are capable of fully automatic or manual operation. The cameras can be operated for long periods; and, when fitted with triax cables, they will produce quality pictures nearly a mile from the control unit.

The customer can select the facilities required: multicore or triax

continued on page 74

new products

continued from page 73

cabling; camera tube type; battery or mains operation; size, and type of viewfinder; local or remote control of the CCU; size and type of lenses; etc.

The Mark IXs have been designed to suit the growing requirement for a camera that can be adapted to suit a variety of operational requirements.

Circle (92) on Reply Card

1-inch videotape

3M Company's Magnetic Audio/Video Products Division has introduced a new master broadcast videotape for applications using the 1-inch format.

Laboratory testing has shown the 1-inch tape, Scotch brand 479, to have higher RF output (3 dB), S/N ratio (2.5 dB) and color noise improvement (3 dB) when compared to a standard high-density videotape. The 740-oersted coercivity, generally higher than previous tapes, also promotes better magnetic performance. The rugged base of the tape permits stop motion, frame-by-frame editing, jogging, and slow motion. Back treatment improves handling and eliminates the backside scratching, a cause of dropouts. The tape's low abrasivity allows for extended head wear.

"Scotch" 479 MBVT is available in 30-, 45-, 60- and 90-minute lengths.

Circle (93) on Reply Card

Motorized azimuth adjust

A machine with motorzied azimuth adjust and random noise generator is now available as part of the Beaucart® broadcast stereo record/playback cart equipment.

The Beaucart machine by *UMC Electronics Co.* can be used in conjunction with an oscilloscope to permit the adjustment of the record-head azimuth to provide an "in phase" relationship between left and right channels.

With record levels set (using the program source input) and with the output level of the reproducer amplifiers set to a standard value, the internally-mounted random noise generator is activated by a front panel-mounted switch to simulate recording on the pre-erased cart.

The technician uses a two-way front panel switch to trim a 278:1 speed reduction motor within the cart machine which drives an off-center cam. A lever arm assembly rides the circumference of the cam to adjust the azimuth of the record head in increments measured in thousandths of an inch.

Circle (94) on Reply Card

Gray scale reference

Telecommunications Industries' Porta-Pattern Color Monitor Gray Scale Reference Unit adjusts picture white and gray scale tracking. The product contains a 10-step gray scale transparency manufactured on special film stock which matches the output of a standard 10-step signal generator. Its application is in control rooms and other technical areas to match color monitor luminance characteristics to a standard independent of transmission system distortions.

The uniform illuminating source is a lamp calibrated at 6500° Kelvin (Illuminant D). Maximum brightness is mechanically adjustable from 5 to 35 foot lamberts without affecting color temperature. Both 115 and 230 VAC models are offered.

Circle (95) on Reply Card

Scanner monitor

Scanner monitors are one way to keep up with local services that often provide the big news story of the day. The new *Heath* GR-1132 is a 3-band monitor that will scan fire calls, police calls, government weather reports, marine, 2-meter, and emergency vehicles.

This VHF/UHF scanner has a priority feature that checks any selected channel every four seconds.

Price Correction

In the June Wrap-up issue it was incorrectly reported that Scully's 250 and 255 instruments are in the $12,000 price range. In fact, the price of the 255 series is in the **$1,200 price range.**

The Scully 250 recorder/reproducer fills both portable and studio needs; the 250 uses only 19¼ inches of rack space. Configurations include full- or half-track mono, two- or quarter-track stereo. Features include full front access for easy alignment.

For reproducer needs only, Scully has the compact 255—perfect for your automated system.

Other features include a four-polecrystal filter (an eight-pole filter for use in congested signal areas is optional), channel lockout buttons, and large, lighted channel indicators.

The unit has its own self-contained adjustable antennas, and includes provisions for external antennas. Designed for easy construction, the kit includes squelch circuits.

Circle (97) on Reply Card

Amplifier

The SPA-500, a processing amplifier by *Systa-Matics Inc.*, features re-generated sync through an internal EIA sync generator which genlocks to incoming video. The SPA-500 generates new sync, blanking and color burst; sync may be turned down for non-composite output.

The proc-amp can be used with an EIA video signal; it is available as a rack or desk top mount, or as an internal option to the company's RAIM 1000 time base corrector.

External controls include six individual adjustments for video, sync, chroma and burst levels, plus burst phase and a pedestal adjustment. Internal adjustments include horizontal and vertical blanking width. Vertical blanking may be adjusted to pass or eliminate VIT signals as needed.

Internally generated sync level is independent of video level. Video is adjustable from .7 volt to 1.25 volts peak-to-peak with 1-volt input. Frequency response is plus or minus .5 dB to 4.2 MHz, and is adjustable with chroma gain. Input number one is switched to output one in the bypass mode.

Circle (98) on Reply Card

Audio opamp

Modular Audio Products' low-noise audio opamp, model 5002, incorporates a fast-slewing integrated circuit with a transistorized output driver.

Notable specifications include EIN, 0.5uV or less; slew rate, 13V/usec; common mode input, ±13V; CMRR, 100 dB; 0.1% THD max. at +20 dBm rated output into 600 ohms, 20 Hz to 20 kHz. The new unit incorporates built-in short circuit and input overload protection for maximum reliability, and operates off a wide range of bipolar supply voltages.

The model 5002 is compatible with MAP models 5000 (1731A) and 1731, and similar makes. It may be used in many existing modular components without external circuit modifications. Applications assistance is available for retrofit and new design requirements.

Circle (99) on Reply Card

Audio console

Harris Corporation's new modular mono/stereo audio console (the M90) for AM-FM-TV on-air production is an expandable, completely modular audio control console with a choice of operating characteristics.

Standard configuration offers a maximum of 56 inputs. Input modules feature microphone and line-level input selection; switchable hi-pass/low-pass filters; gain trim; optional three-section equalization; access to two echo send channels; and a post- or pre-fader Solo/Cue system. Input levels from -70 dBm to +20 dBm can be accommodated.

Separate monitor input selection is employed for control room, studio, and headphone monitoring. Monitor muting is interfaced to input module

continued on page 76

new products

continued from page 75

on/off and mike/line switches in typical on-air fashion, except that reprogramming of muting is simplified by use of transistor-to-transistor logic (TTL) circuitry.

Other features include talkback with self-contained microphone; foldback; programmable control room and studio muting; test oscillator; patch points; and a line of matching accessories, including a plug-in patch bay.

Circle (130) on Reply Card

Fiberoptic duplex data link

Valtec's fully engineered, duplex, asynchronous TTL fiberoptic data link in now available. Each end of the link has a self-contained optical transmitter, optical receiver, and power supply.

The electrical signal input/output is through standard BNC connectors. The link is powered by ordinary wall current using the power cord (included).

Transmission capability up to 3,000 feet is built-in. This TTL link provides users with the advantages of immunity to EMI, low-cost cable installation, secure lines, and safety in hazardous areas, according to Valtec.

Circle (131) on Reply Card

Studio production switcher

The Mincom Division of 3M *Company* introduced a studio production switcher with built-in microprocessors providing event memory and simplifed operation, at the NAB convention.

The model 9000 video production switcher offers a departure from traditional switcher design. The use of microprocessor technology allows for simplified control panel design and layout. A built-in memory allows preparation and storage of up to eight panel setups for recall during difficult production sequences.

More than 20 effects are selected by a 10-key input bank. Twelve inputs, including black burst and color background, are available. Effects are generated in hard-switch, soft-switch, or border-wipe form; a chroma-key feature is optional.

Capabilities of the new switcher include wipes behind key:

Circle (132) on Reply Card

professional services

advertisers' index

classified

Advertising rates in Classified Section are 50 cents per word, each insertion, and must be accompanied by cash to insure publication.

Each initial or abbreviation counts a full word. Minimum classified charge, $4.00.

For ads on which replies are sent to us for forwarding (blind ads), there is an additional charge of $5.00 per insertion, to cover department number, processing of replies, and mailing costs.

Classified columns are not open to advertising of any products regularly produced by manufacturers unless used and no longer owned by the manufacturer or a distributor.

TRAINING

FIRST PHONE in six to twelve weeks through tape recorded lessons at home plus one week personal instruction in Boston, Philadelphia, Detroit, Atlanta, St. Louis, Seattle or Los Angeles. Our twentieth year teaching FCC license courses. Bob Johnson Radio License Preparation, 1201 Ninth, Manhattan Beach, Calif. 90266, Telephone 213-379-4461. 8-75-tf

PASS FCC first and second class exams with new 21-lesson, 450-page course. Starts with basic electricity. Over 600 FCC-type, multiple-choice questions and sample exams included. No previous technical knowledge required. Commercial Radio Operator Theory Course, #15-01. Only $6.95. Ameco Publishing, 275G Hillside Ave., Williston Park, N.Y. 11596. 8-72-tf

PASS FCC EXAMS with Ameco books. Each book contains FCC questions plus simplified answers plus FCC-type exams and answers. 3rd class includes broadcast endorsement $1.25. 2nd class $2.50, 1st class $1.60. Free catalog. Ameco Publishing, 275G Hillside Ave., Williston Park, N.Y. 11596. 8-72-tf

GRANTHAM'S FCC LICENSE STUDY GUIDE—377 pages, 16 FCC-type practice tests, 1465 questions with answers and discussions—covering third, second, and first class license exams. $13.55 postpaid. GSE Publications, 2000 Stoner Ave., Los Angeles, CA 90025. 10-77-tf

ELECTRONICS DEGREE by correspondence. No commuting to class. Study at your own pace. Begin with basics and continue, first for A.S.E.T. and then for B.S.E.E. For free brochure, write: Information Desk, Grantham College of Engineering, 2000 Stoner Avenue, Los Angeles CA 90025. 10-77-tf

SERVICES

BUILD YOUR OWN TV AND RADIO PRODUCTION EQUIPMENT. Easy, inexpensive, (mostly IC). Plans or kits: Special Effects Generator, Automatic Logger, Vertical Interval Video Switcher, Solid State Lighting Board, Preset Audio-Video Board, Preset Lighting Board, Crystal Controlled Wireless Mikes with Matching receivers. Subsonic Tone Control for audio tapes, 8MM SOF Cameras and Projectors, Distribution Amplifiers (Sync. Video, Audio), Audio Control Boards (Studio & Remote) Proc-Amp with compensation and regeneration for adapting Helical Scan VTR's to broadcast standards. PLUS specialized correspondence courses in TELEPHONE Engineering ($39.50), and Integrated Circuit Engineering ($49.50). Plans from $5.95 to $15. SUPER CATALOG plus years updating of new devices Air Mailed $1.00. Don Britton Enterprises, P.O. Drawer G, Waikiki, Ha. 96815. 5-77-32t

TOWER PAINTING AND LIGHTING: Service and maintenance contracts offered. Pioneer Tower Service, P.O. Box 253, Carrollton, Missouri 64633, (816) 542-0840. 9-77-tf

LOWEST PRICES on new Fidelipac and Audiopac cartridges. Check our low prices on rebuilding, too! Rocky Mountain Cartridge, Box 1676, Pueblo, CO 81002. 7-78-1t

SERVICES (CONT.)

FREQUENCY MEASURING SERVICE—WE'RE #2—MONITOR REPAIRS—MOBILE UNIT—covers Northern ⅔ Ill., Eastern Iowa, Eastern Minn., Southern ⅔ Wis., Western Mich., and Western Ind., monthly. Radio Aids, 528 Ravine Ave., Lake Bluff, Illinois 60044, (312) 234-0953. 2-74-tf

COMMERCIAL RADIO MONITORING CO. Precision frequency measurements since 1932. Local and mobile service covering entire midwest plus. Test instruments, counters, monitors repaired and certified. Lee's Summit, Mo. 64063. (816) 524-3777. 9-74-tf

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

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

WANTED

WE NEED YOUR HELP: A Bible believing local Church with an expanding radio ministry urgently needs your donation of used or serviceable audio equipment to expand its outreach. Consoles, Mikes, TTs, Cart or Tape Machines are needed. Your donation is Tax Deductible. Please write Rev. P. M. Bowen, United Mission Church, Box 40594, San Juan, P.R. 00940. 5-78-4t

WANTED: Used FM stereo transmitter 1 KW and used AM transmitter 5 KW. Not more than 10 years old. Radio MBC, Box 367, Port-au-Prince, Haiti. 7-78-1t

TK-27 FILM CHAIN and TR-60 Video recorder. (901) 458-2521, C.E. 6-78-2t

WANTED: Recording gear of all ages and variety. Microphones, outboard gear, etc. Dan Alexander, 6026 Bernhard, Richmond, CA 94805, (415) 232-7933. 4-78-6t

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: Dumont 9000 heat exchanger coil. Carl Verboomen, Box 183, Wrightstown, WI 54180. (414) 532-4397. 7-78-1t

WANTED: A reliable combo-man. Heavy emphasis on engineering including routine maintenance on automation, FM transmitter and stereo and solve related problems. Contact Manager, WDBI-FM, Tawas City, Michigan. 7-78-2t

COMMUNICATIONS PRODUCTS WANTED: Established representative wants to market for small manufacturers. (214) 231-8014. 7-78-1t

EQUIPMENT FOR SALE

AMPEX TBC-793. Includes ALL options. Factory quality control. Brand New. $2,500.00. Dave Castellano (209) 957-1761. 7-78-2t

USED TAPE CARTRIDGES, 50 for $35.00, 100 for $50.00, plus freight. Write for list. CART MART, P.O. BOX 3066, FORT WORTH, TX. 76105. 7-78-3t

SPINDLER-SAUPEE 35mm Dual Drum Slide Projector, Model 32 with 9" F-5 Lens. Dave Castellano (209) 957-1761. 7-78-2t

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

EQUIPMENT FOR SALE (CONT.)

NEWLY FACTORY RECONDITIONED MICROTIME 640 TIME BASE CORRECTOR... And CONAR 255 Solid State Scope, both $6,000.00. Contact Nick Paonessa, Super "6" Enterprizes, (716) 285-5000, 617 72nd Street, Niagara Falls, N.Y. 14304. 7-78-1t

FOR SALE—UNUSED 227' SELF-SUPPORTING TOWER DESIGNED TO SUPPORT 6 BAY FM ANTENNA IN ZONE A. GALVANIZED, LIGHTING KIT, BOLTS, LADDER AND NECESSARY HARDWARE FOR ERECTION. ALL ENGINEERING AND DRAWINGS AVAILABLE. $16,950.00. V & B TOWER CONST. CO., BOX 972, VINITA, OKLA. 74301, (918) 256-7366. 7-78-1t

RCA-TK-76 with 10.5-105 Canon Auto-Zoom, A.C. power supply, batteries & cables, Fujinon Sports V.F. & Cases. M. Schlansky, (212) 594-8700. 7-78-1t

ONLY 400 HOURS MAXIMUM ON THIS: Hitachi FP1212ER Camera w/10:1 Zoom Lens and Head Sets; Camera Close-up Lens Adapter Mod. CL 1900; Quick Set Tripod Mod. 4-57021-8, Cam Link Head Mod. 4-52304-9, Handle SET Mod. 4-55640-L, and Dolly Mod. 4-56020-7; 3 pcs. 125' Camera Cable; Tektronix 528 Wave Form Monitor; 2 each Sony 2850 ¾" U-matic VCR, 2 each Sharp C133M Monitors; 1 Sony RM400 Editor; Shure SE30 Audio Mixer; Strand Century 15005 Light Set; Bratford Mobile Cart Mod. MPUC 54E. PLUS—Mobile Van—Ready for location work, 8000 original miles, 1976 Ford E350-158 parcel delivery. 14 x 9½ ft. studio has walls and floor carpeted and insulated, cable hatch, shelves, etc., 351 Ci V8 Engine, Capt. chairs, A/T, A/C, P/S, 90 Amp Alt., Aux. battery, Aux. fuel tank. $50,479.42 package for $35,000. Bids considered. Call: 804-486-7900, Lou Gabler, London Bridge Productions, 2460 Potters Road, Virginia Beach, Va. 23454. 7-78-1t

TEKTRONIX RM 529 WAVEFORM MONITOR, just calibrated & repaired by Tektronix, excellent condition. Ready for immediate shipment, $1200. Cape Fear Enterprises, Rt. 1, Box 269A, Falson, NC 28341. Telephone (919) 594-0172. 7-78-1t

FOR SALE EQUIPMENT: Microtime 2020 TBC original like new condition. Very little use. Also Dynasciences 834 Image Enhancer. New, never used. Both reasonably priced. Contact Myron Overton (805) 324-7239. 7-78-1t

(1) COMPLETE AM STATION and studio equipment except transmitter, includes frequency and modulation monitors, $3,600.00 complete. (3) RCA 1 wt. microwave with 2 sound modulators, 4 sound demod., 1 weather housing for receiver head; good cond. $2,500.00 ea. set. (1) PCP-90 handheld color ENG camera $10,000.00. (1) LDH-20 Philips color complete with broadcast plumbicons, 25:1 zoom, cable, etc., $10,500.00. (2) EL8603 color encoders for PC70 cameras, $500.00 ea. (4) TK42 RCA color cameras, $1,500.00 ea. **Camera tubes**—all types—our 2,000 hour guaranty—XQ1020, XQ1025, all colors, $1,250.00 ea; 8673—$850.00 ea., 7735B, 8572, 8134, 8480—all reduced. **Transmitting tubes**—Eimac, etc.—discount prices. Temtron Electronics Ltd. 138-69 Francis Lewis Blvd., Rosedale, NY 11422. (212) 978-5896. 7-78-1t

IVC EDITING SYSTEM, includes one each IVC 960CR; IVC825ACR; & TRI EA5. Cost new $32,000. Mint Condition. $15,000 buys all. Kettering Medical Center, 3535 Southern Blvd., Kettering, Ohio 45429, 513/298-4331, ext. 526. 7-78-1t

DATATRON 5050 EDITOR modified for 3 VTR's. Ideal way to break into time code editing. (216) 822-3770. 4-78-tf

RCA VTY MODIFICATIONS KITS for TR4/22/50/60/61/70. Splicer (single-frame), TEP Interface, Time Code Edit Interface Kit, Audio Splice Timing Mod (Audio Insert Editor), Wideband Audio Amplifiers, most mod kits, some modules available. LAWHED, LTD., 388 Reed Road, Broomall, Pa. 19008, (215) 543-7600. 4-78-tf

LIGHT PEN Tektronix 4501 scan converter and homemade interface. (216) 822-3770. 4-78-tf

IVC-800C's—Good condition. With cases. $1,000. Contact Derryl Williams (513) 433-3016. 7-78-1t

EQUIPMENT FOR SALE (CONT.)

FOR SALE—NEW UNUSED: Complete System Television Transmitter Channel 10—192-198 MHz. Complete Television Transmitter System Channel 10—180-186 MHz-5 KW Visual 1.1 KW Aural including Filter Plexer 5 KW, Dummyload 5 KW, Filter Sets VHF Harmonic, Filter Video Low Pass - Kits Spare Tubes, Semi-Conductors - Complete Data Including Operating Manuals, Schematic Parts Lists and Installation Drawings. Priced for quick sale. Contact Edw. Malavarca, Box 448, Dover, N.J. 07801, or call (201) 361-7200. 7-78-1t

FOR SALE—Six PC-70s Norelco cameras, one PCP-70 Norelco, audio, monitors, custom 35-ft. Gerstenlager mobile unit with distribution, etc. We are expanding to triax and a trailer. Also one PCP-90 with film-lens adapter, one VR-3000, one DMI disc. All equipment well-maintained by one of most highly regarded technical staffs in US. Jefferson Productions, Charlotte, N.C., (704) 374-3823. 6-78-2t

ASACA—5 Cameras—4 ACC 7000, 1 ACC 1000 for sale. Used for demonstration only, value over $150,000. Best cash offer. Art Florman, F&B/CECO, 7051 Santa Monica Blvd., Hollywood, Ca. 90038, or call (213) 466-9361. 5-78-3t

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

USED TV BROADCASTING EQUIPMENT FOR SALE: TV Transmitter System consisting of the following: General Electric 4TT10A1 Visual & Aural Transmitter; Standard Electric AL634 30 KW Amplifier; Standard Electric TF813 Dummy Load; Standard Electric Visual & Aural Harmonic Filters; Standard Electric Diplexer; Ward Electronics TA-860 Color Phase Equalizer and video low pass filter system; Spare plate transformer for Standard TF813 Amp.; R.C.A. BW5 sideband response analyzer; 1 R.C.A. Channel 5 1 KW filterplexer. For further information or details please contact: Mr. Rod Reid, Chief Engineer, CKVR CHANNEL 3 LIMITED, Box 519, BARRIE, Ontario, L4M 4T9, (705) 726-9711 or Toronto Line 364-8819. 7-78-2t

AMPEX VR 1200 OH. AUTOCHROMA, AFC, Framer, Bearing and Venturi Air 32,000, Ampex VR 1000, Intersync, Amtec, Colortec, Color Proc, Editor, Allen Mod-Demod, Bearing and Venturi Air 6,000. D. Zulli, (213) 466-5441. 6-78-2t

MODEL 3060 SMC Automation for sale. Call 609-983-6202 or write TBC Realty, 700 State Highway 73, Marlton, New Jersey 08053. 7-78-1t

HELP WANTED

ASSISTANT MANAGER—ENGINEERING: Digital knowledge essential. 1st phone. Minimum five years TV maintenance experience. Must thoroughly know 2" VTR's, TK-27 film chains, E.N.G. equipment (inc. TBC's, MW, and framestore) and VHF transmitters. Ability to train, as well as supervise and assist others, is required. Send resumes to KFMB-TV, P.O. Box 80888, San Diego, California 92148, Attention: John Weigand. An Equal Opportunity Employer. M/F. 7-78-1t

TV ENGINEER. University public TV station—WBGU-TV, operation and maintenance of equipment for full-color broadcast and CCTV facility. First Class FCC license required. Send application, resume, school or college transcript(s), three letters of recommendation by July ½¼ to William Leutz, chief engineer, WBGU-TV, Bowling Green, Ohio 43403. An Equal Opportunity Employer. 7-78-1t

OPERATING AND MAINTENANCE ENGINEER with First Class FCC License. Immediate openings, ideal community, located in Alaska. Send resume and salary requirements to: George Howard, Chief Engineer, Northern Television, Inc. Box 2200, Anchorage, Alaska 99510. An EOE. 7-78-2t

HELP WANTED (CONT.)

EMPLOYMENT OPPORTUNITIES
$15,000-$40,000
(coast to coast)

Hundreds of current openings in the BROADCAST ENGINEERING INDUSTRY: (TV BROADCAST STATIONS) — (MANUFACTURERS OF EQUIPMENT AND COMPONENTS) — (VIDEO SYSTEMS, CCTV, ITV, CATV). Positions in Engineering Service, R&D, Maintenance, Systems, Management, Sales, Marketing, etc. To cover ALL your job possibilities in the "unpublished market" send your resume with salary requirements now. No fee, confidental, professional. KEY SYSTEMS, NEW BRIDGE CENTER, KINGSTON, PENNA 18704 (717) 822-2196. Employer Inquiries Invited. 7-78-TF

MAINTENANCE SUPERVISOR—Immediate opening for maintenance supervisor in leading, good music station in New York Metropolitan Area. Excellent benefits and compensation for the right person. First phone and heavy maintenance experience necessary. (201) 345-9300. AN EQUAL OPPORTUNITY EMPLOYER. 7-78-1t

BROADCAST TECHNICIANS with experience in RCA quad tape recorders and/or maintenance knowledge of digital concepts desirable. Contact: Guy London, Ohio Educational Television Network, 2470 North Star Rd., Columbus, Ohio 43221. An equal opportunity employer. 7-78-1t

VIDEO OPERATIONS and maintenance engineer needed for a major market TV station production facility. Extensive experience in setup and operation of broadcast cameras, quads, time code editing, etc. Excellent salary and benefits—an Equal Opportunity Employer M/F. Send resumes and salary requirements to: Broadcast Engineering, Dept. 421, P.O. Box 12901, Overland Park, KS 66216. 6-78-2t

KMXT-FM IN KODIAK, ALASKA is looking for a Chief Engineer to begin work September 1, 1978. The Chief Engineer is responsible for the entire technical operation of the radio station. The Chief must be able to install, repair and maintain all equipment necessary to the legal operation of the radio station. Must have a working knowledge of F.C.C. Rules and Regulations. Must be able to conduct a station "proof of performance" at the intervals required by the F.C.C. Reports directly and takes direction from the General Manager. Must be approved by the Alaska Public Broadcasting Commission. Has the responsibility to see that all on-air personnel are familiar with the proper operation of all equipment and the proper F.C.C. logging procedures. The Chief must have a 1st Class License. Salary: DOE. Please submit resume to Kodiak Public Broadcasting Corporation, Box 484, Kodiak, Alaska 99615. 7-78-1t

SUPERVISOR TV ENGINEER

Immediate opening for experienced TV Engineer with supervisory experience. Must be a graduate of an acceptable technical institute, and/or have a minimum of 6-8 years supervisory experience in modern television broadcast studio operation. Requires extensive maintenance experience, knowledge of all aspects of studio and master control operations, and capability of instructing personnel. Salary varies according to experience and training (position with KOMU-TV-NBC affiliate). Please contact:

UNIVERSITY OF MISSOURI COLUMBIA

Personnel Services
309 Hitt St.
Columbia, MO. 65211

Equal Opportunity Employer M/F

At last, the right job in the right location.

The Grass Valley Group, a leading manufacturer of television broadcast equipment, is offering some unusual job opportunities in a rural setting—the serene, recreationally abundant foothills of California's Sierra Nevada mountains. The job opportunities are challenging and require individuals with proven experience, initiative and self-confidence.

Project Engineer
An excellent career opportunity for an individual to assume responsibility for challenging research and development projects. This position requires an individual with video project experience plus a BSEE or equivalent.

Design Engineers
We are looking for qualified circuit design engineers with BSEE and who possess a good knowledge of analog and digital circuitry.

Field Service Engineer
We need an individual with a BSEE or equivalent who is willing to travel in the U.S. and abroad. Position offers both marketing and engineering opportunities.

Customer Training Instructor
To develop training program for customers in use, maintenance and troubleshooting of Grass Valley Group equipment. BSEE or equivalent plus broadcasting experience.

Systems Test Engineers
These ENTRY-LEVEL positions offer many opportunities for career growth. Individuals chosen will perform comprehensive testing of television systems.

Interest and qualified applicants are invited to send a resume in confidence to Val R. Marchus, The Grass Valley Group, Inc., P.O. Box 1114, Grass Valley, CA 95945. An Equal Opportunity Employer M/F.

The Grass Valley Group
A Tektronix Company

HELP WANTED (CONT.)

A CALL TO SERVE—We have continuing and varying needs for experienced engineering personnel. More professional people are wanting to make their lives and talents count for something worthwhile with external consequences. If you feel a call to serve and can be happy with hard work, sacrifice and modest remuneration, you could become a part of one of the world's most exciting happenings. Send resume to Personnel Division, Drawer C, Christian Broadcasting Network, Virginia Beach VA 23463. CBN, producer of "The 700 Club," is an Equal Opportunity Employer. 6-78-4t

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

STUDIO OPERATOR—We are a top independent television station located in Portland, Oregon and are looking for a full-time Television Engineer. The successful applicant must have a First Phone and have at least a year in solid state and digital circuits gained through school or work experience. Previous experience as a studio operator would be helpful. The salary range is $11,460-$15,265 a year depending on experience and/or education. Send resume to Todd Young, Oregon Television, Inc., P.O. Box 3401, Portland, Oregon 97208. 7-78-1t

ENGINEER TO SHARE RESPONSIBILITIES FOR MAINTENANCE and technical operations of TV remote truck. We are growing and need more help. Must be good troubleshooter and enjoy location video recording. Some travel. Larry Huisinga, New Life Communications, 424 W. Minnesota, Willmar, MN 56201. (612) 235-6404. 7-78-1t

BROADCAST FIELD ENGINEERS

RCA Service Company has several opportunities for field engineers with at least 3 years experience in the maintenance and repair of VHF and UHF television transmitters, television tape and/or color studio equipment. Successful candidates should have a 1st Class FCC Radiotelephone license, plus a strong digital electronics background.

Positions offer salaries commensurate with qualifications and experience, plus outstanding benefits including:

- Free medical insurance for you and your family
- Free life insurance
- Paid vacation and holidays
- Liberal retirement program

Relocation unnecessary if you are now located near good air transportation service.

For immediate consideration, send resume in confidence to:

Mr. J. F. Sheehan
RCA Service Company
Bldg. 201-2 Cherry Hill
Camden, N.J. 08101

Equal opportunity employer F/M.

RCA

HELP WANTED (CONT.)

OPENING FOR PROFESSIONAL VIDEO TECHNICAN or engineer in JULY. Salary good and negotiable. Position is with a professional video contractor selling, installing and servicing all aspects of video systems. Must have 1st phone or equivalent degree with at least two years field experience in installation and maintenance of all related analog and digital video systems. Professional Electronics Company, 2820 Curry Road Extension, Schenectady, New York 12303 PH (518) 355-3120.

MANAGER OF ENGINEERING
Outstanding educational broadcasting and production facility in Chicago area seeks person experienced in management, studio operations and maintenance. Salary $20,000+, EOE. Send salary req. and resume to Broadcast Engineering, Dept. 422, P.O. Box 12901, Overland Park, KS 66212.

PROFESSIONALS ACCREDITED

PROFESSIONAL BACHELOR DEGREE....earned with 4 or more years of Broadcast Business Management, Sales, or Servicing Experience. For FREE information, WRITE: ELBERT PROFESSIONAL INSTITUTE, Box 1651, Dept. B, Columbia, Missouri 65201. 6-78-6t

BROADCAST ENGINEERING

Regional Advertising Sales Offices

Indianapolis, Indiana—*Roy Henry*, 2469 E. 98th St., Indianapolis, IN 46280, (317) 846-7026.

New York, New York—*Stan Osborn*, 60 E. 42nd St., Room 1227, New York, NY 10017, (212) 687-7240.

Mountain View, California—*Dennis Triola*, 2680 Bayshore Frontage Rd., Room 102, Mountain View, CA 94043, (415) 961-0378.

London, England—*John Ashcraft & Co.*, 12 Bear St., Leicester Square, London, WC2H 7AS, 930-0525.

Badhoevedorp, Holland—*John Ashcraft & Co.*, John J. Lucassen, Mfg., Sloterweg 303, 1171-VC Badhoevedorp, Holland, 2968-6226.

Tokyo, Japan—*International Media Representatives, Ltd.*, 2-29 Toranomon 1-chome, Minato-ku, Tokyo 105, Japan, 502-0656

BROADCAST engineering®

For issue of July 1978—Use until October 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 (** **)** _____

1	13	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
2	14	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
3	15	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
4	16	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
5	17	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
6	18	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
7	19	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
8	20	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
9	21	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
10	22	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
11	23	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
12	24	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 July 1978—Use until October 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 (** **)** _____

1	13	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
2	14	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
3	15	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
4	16	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
5	17	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
6	18	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
7	19	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
8	20	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
9	21	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
10	22	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
11	23	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
12	24	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 July 1978—Use until October 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 (** **)** _____

1	13	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
2	14	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
3	15	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
4	16	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
5	17	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
6	18	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
7	19	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
8	20	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
9	21	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
10	22	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
11	23	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
12	24	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.

OU'RE A
FECTIONIST
U'VE MET
UR MATCH

IZ TV, Baltimore, Maryland

...'re ... about audio quality, yo... in our
...ment ... ...anding about our engine... quality
...l ... Make that read "down...
...'re ... ...aining complete in-ho... ...uring
... painstaking quality contro... help
... innovator the one oth... They
... most reliable and advan...
...ead every word of our e... most
...stry. And while you ... list.
...think you'd be proud to ... day.
...contact Audio Design... 16005
...48056. Phon... 1114.
...USA by Am...

CONSOLES & COMPONENTS for audio control

AUDIO DESIGNS

The Audio Company

SqueeZoom™

is...

One Channel

FRAME SYNCHRONIZER
Locks all remote signals to house sync. Network, ENG, Remote pick-ups, and satellite signals will mix with local signals with no distrubance.

Sampling video at 4 times subcarrier for superior technical standard and picture quality.

TIME BASE CORRECTOR
Will "NTSC" COLOR and sync of low cost VTR's.

FRAME FREEZER
Will act like having another camera in the studio for still shots. Will freeze any full frame picture. Will retain last frame of interrupted incoming signal automatically until picture is restored.

VIDEO COMPRESSOR
No matter how a slide or scene comes in, you can compress and/or change its aspect ratio as you wish, down to one picture element, and position it anywhere on the screen.

ELECTRONIC ZOOM
See or read information not possible without zoom.

In sports, determine if ball is good, simply freeze and enlarge. Call foul plays more accurately. Zoom capability on a remote or recorded scene. Zoom while chroma key tracking.

VERY SPECIAL EFFECTS
With 2 channels or more, open new unlimited vistas of movie-type effects.

GENERATE your own effects with Vital's pre-programmed micro-processor.

Record 4 pictures on one recorder and play back any one full screen with no perceptible degradation.

Observe or monitor 4 TV channels on one receiver; listen to any one audio.

Conceived, designed, and manufactured in Florida by **Vital Industries, Inc.**- makers of the VIX-114 Series Switching Systems.

Or up to 4 Channels in One

You will not be locked out with one video channel "Squeezoom." Add other channels as you wish. Too many exciting features and applications to describe. Call us toll free 1-800-874-4608.

HI TECHNOLOGY PRODUCT INNOVATORS

VITAL INDUSTRIES, INC.

MAIN OFFICE: 3700 N.E. 53rd Ave., Gainesville, Fla. 32601 U.S.A. • Tel.: Area 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 Coast
7960 West Beverly Blvd.
Los Angeles, California 90048
Phone 213/653-9438

Circle (1) on Reply Card