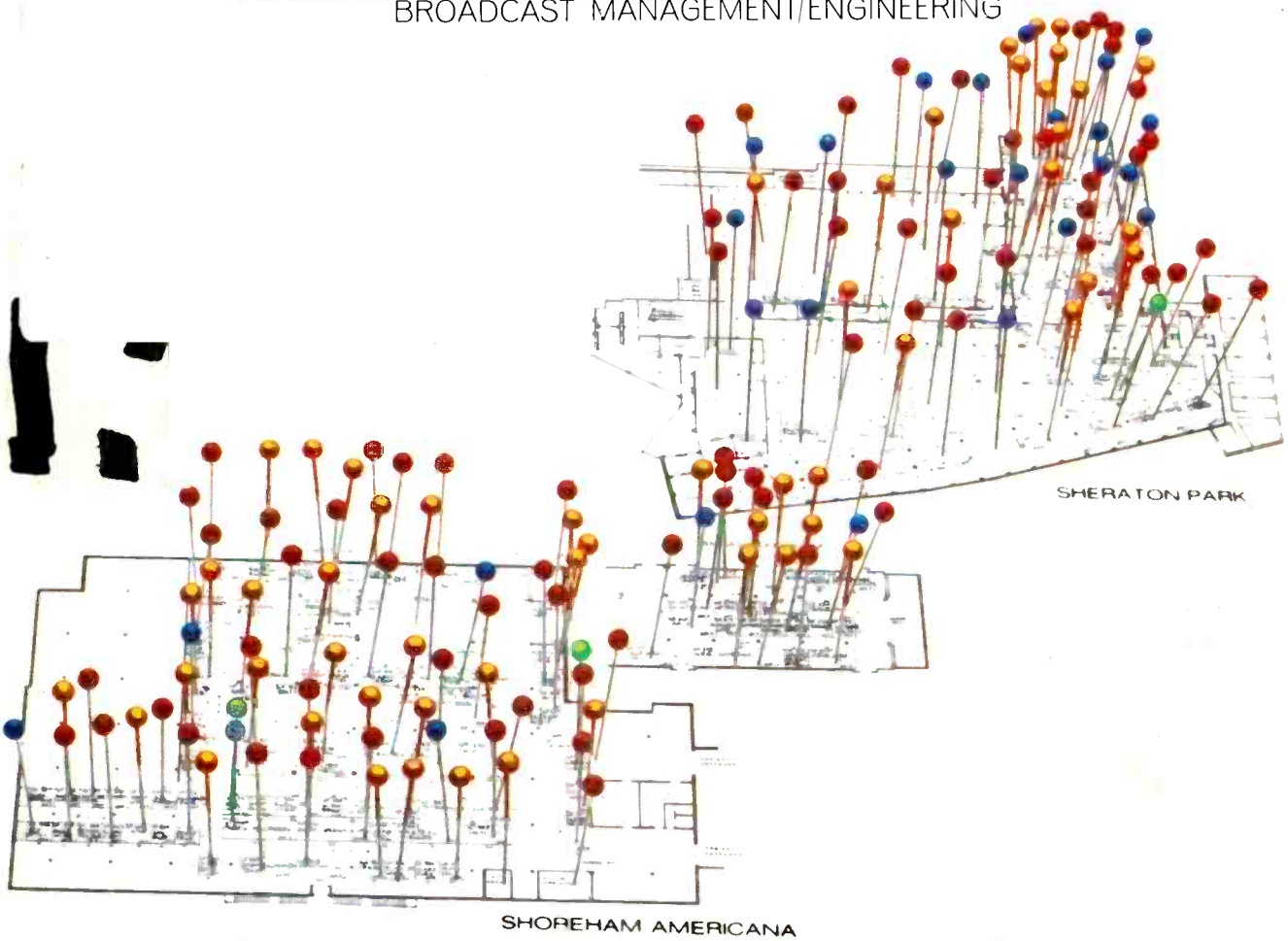
MARCH 1977

BM/E

BROADCAST MANAGEMENT/ENGINEERING

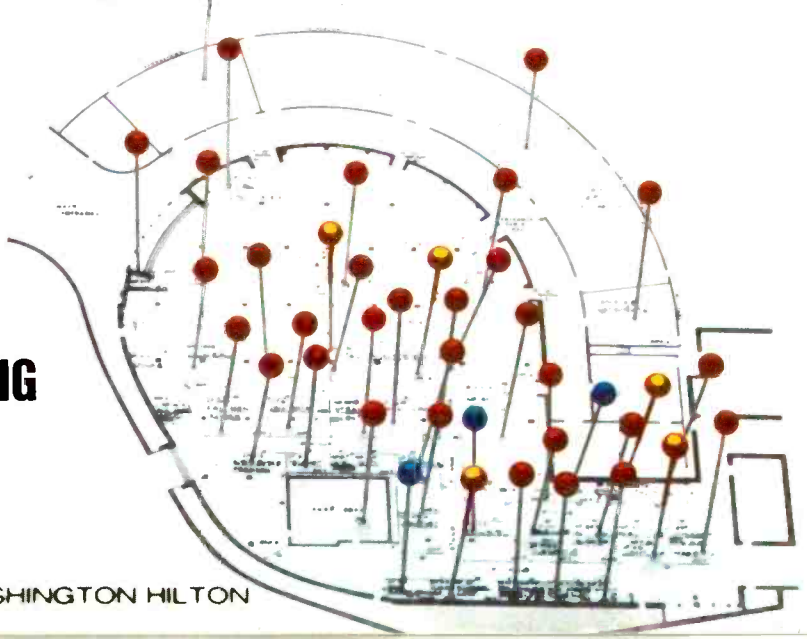


SHERATON PARK

SHOREHAM AMERICANA

BROADCASTER'S GREATEST SHOW ON EARTH STARS

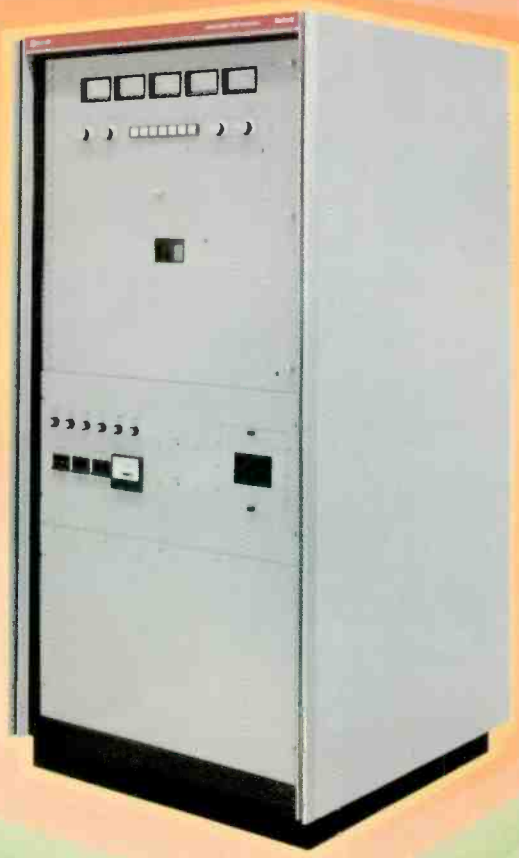
★TV ★RADIO ★RF ★TEST & MEASUREMENT EQUIPMENT AT NAB '77 THREE RING EVENT.



WASHINGTON HILTON

ALSO: RADIO & TV PROGRAMMING FEATURES.

TWO NEW COLLINS SOUNDS:



THE MARK 8 & THE POWER ROCK

A new high efficiency 5-kW AM transmitter and a new high performance stereo console at lower prices . . . They're here! The new Power Rock AM transmitter with high performance, super-efficiency and a super-competitive price. And a Collins eight channel stereo console that offers superior performance at a price 50% less than our ten channel model.

The new Collins 828E Power Rock 5-kW AM transmitter: Uses switching modulation (the time-proven technique used in most high efficiency regulators) and a new high efficiency RF amplifier. This adds up to lower power bills • Features an advanced output network called Q-Taper which improves frequency response and reduces adjacent channel cross-modulation interference • Other goodies: Automatic power output and modulation control. 125% modulation capability. Built-in diagnostic aids. Plus other features that foreshadow the day of automatic transmitter operation • And it's all in a cabinet the size of a 1-kW unit!

The new Collins Mark 8 Stereo Console is an engineer's delight: All plug-in constructior — switches, PC boards, attenuators and amplifiers. Plus a host of other maintenance aids • Performance that equals consoles several times its cost: 22 dB of headroom. ½-dB frequency response. ¼% harmonic and intermod distortion. Big 25-W monitor amps. 5-W headphone amps. And optional machine control functions for ease of operation.

For more information on the Power Rock and the Mark 8 or any of the full line of Collins quality broadcast products, contact your local Collins Broadcast salesman. Or Broadcast Marketing, Collins Commercial Telecommunications Division, Rockwell International, Dallas, Texas 75207. Phone: (214) 690-5574 or 5424.

Rockwell International

...where science gets down to business

See them at NAB Park Sheraton Hotel

Circle 100 on Reader Service Card

"Max, this is the third free giveaway poster in the series."

"Yes, Maxine, and anyone can call or write for their copy."

SEE US AT NAB BOOTH #226, SHERATON PARK HOTEL.

Videomax has refurbished more types of quad heads than any other company in the world. See Videomax for heads "better than new" with the best price and performance advantages in the industry.

VMX® videomax®

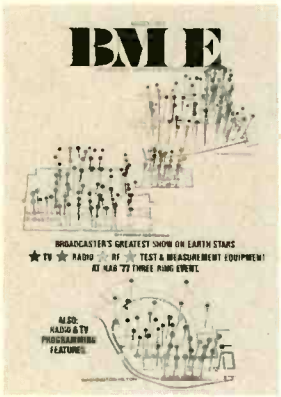
Videomax, An Orrox Company
3303 Scott Boulevard, Santa Clara, CA 95050
Phone: (408) 988-2000 Telex: 910-338-0554

SALES AND SERVICE – New York: (212) 947-8031, Los Angeles: (213) 980-7927, Atlanta: (404) 992-4490

Munich Office: (089) 967-622

Circle 101 on Reader Service Card

BM/E
BROADCAST MANAGEMENT/ENGINEERING



This month's cover depicts the NAB 3-ring convention that will take place at the Washington Hilton, the Sheraton Park and the Shoreham. Colored pins represent where various equipment will be found: TV (red), radio (orange), RF (blue) and test & measurement equipment (yellow).

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

MARCH 1977/VOLUME 13/NUMBER 3

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

DVE

DIGITAL VIDEO EFFECTS: A unique range of electronic effects previously unachievable except by optical techniques.

NAB
BOOTH
209

THE GRASS VALLEY GROUP, INC.

A TEKTRONIX COMPANY

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

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

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

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

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

BROADCAST INDUSTRY NEWS

FCC Begins Web Investigation

Following petitions from Group W and the Justice Department requesting an investigation of network relations with affiliates, the FCC began to gather facts in January upon which to base such an investigation.

FCC Chairman Wiley outlined the goals of the investigation in speeches to the INTV in San Francisco and the California Broadcasters Association meeting in San Diego. In calling for the investigation, Wiley said, "I do not mean to suggest that I have formed any judgements, even of a tentative nature, regarding various allegations of anticompetitive conduct on the part of the networks."

But, said Wiley, "It has been alleged—correctly or incorrectly—that the networks' overall economic position is so strong that they exercise an inordinate degree of control over programming decisions of their affiliated stations." Wiley indicated that since it is the licensee that is bound legally to responsibility for programming, it is incumbent upon the FCC to see if the network relationship to the licensee impinges on fulfillment of such responsibility.

A special task force will be set up using personnel from the Broadcast Bureau, Office of Plans & Policy and General Counsel's Office, to evaluate comments and make recommendations. The areas that the investigation will focus on include network interests in programs produced by independent suppliers, entertainment programs produced by the networks themselves, contractural agreements requiring use of network production facilities by independent producers and options for future program seasons; exclusive rights to new programs, exhibition rights to re-runs on networks, and the relationship between network O&Os and the suppliers of syndicated programs.

In the area of affiliate relations, the FCC will seek comments on such things as clearance of network shows and expansion of network schedules, procedures for affiliate pre-screening of network shows, and the relationship between affiliate compensation and their independence from networks. Comments should be filed by May 2 and replies by June 1. The investigation should be completed within a year after these filings.

Viacom Turns Down Storer

In a letter to William Michaels, Storer Broadcasting's board chairman, Ralph Baruch, president of Viacom International, Inc., turned down Storer's bid to buy up Viacom's stock for an estimated $54.6 million or $15 per share.

The rejection of the bid was expected since Viacom's stock is generally considered to be undervalued at 13⅜ and as Viacom has enjoyed five consecutive years of record revenues and profits. A stockholder, however, has instituted a class action suit against Viacom's Board of Directors and the corporation charging that the merger bid from Storer should have been accepted.

Storer, in addition to its broadcast holdings, has 172,000 CATV subscribers and with the addition of Viacom's holdings, would become the nation's fifth largest cable operators. Viacom has also recently announced the acquisition of international distribution rights to a number of prized television series including, "Phyllis" and "Rhoda."

The Fourth Market Discussed At INTV

Al Masini, far left, president of Telerep Inc., outlined Operation Prime Time at the recent INTV Convention. (See page 12.) Other panelists discussing the fourth market—the fourth network as it is popularly called—were Stan Newman, Robin French and Archer Knowlton above.

KBMA-TV'S Wormington To Indie Operators—"Go Earth Station, Fast"

Independent stations which do not now have earth stations for reception of satellite programming offerings were urged to make the investment as rapidly as possible "If we are truly to obtain fourth network status," by Bob Wormington, president and general manager of station KBMA-TV, Kansas City, at the Fourth Annual Convention of the Association of Independent Television Stations, (INTV) in San Francisco last week.

Despite the investment which Wormington estimated to be about $100,000 for a 10-meter dish, "The price of a couple of TV cameras," he pointed out that the savings in satellite transmission for various sports programming alone would amortize the costs in a comparatively short time.

"In 14 different sports events," said Bob, "KBMA-TV's average savings

continued on page 8

REFLEX® 20

THE 20-MINUTE *burping* CHARGER

And

NI-CAD Super-Batteries For ENG

Ikegami HL-33/HL-35
Ikegami HL-77
RCA TK-76
Hitachi SK-80
Sony VO-3800/BVU-100
JVC CR-4400U
Akai VTS-150B
Sylvania Sun Gun

SEE US
at NAB
Booth 433

READ
all about Ni-Cads and "Burping" in April SMPTE Journal

CALL
TOLL-FREE
(800) 421-2058
for more information or "Burping" Article reprint

ONLY CHRISTIE CAN SOLVE YOUR BATTERY PROBLEM!

Battery charging has been our business for almost 50 years. In 1969 we started burping (REFLEXing) ni-cads for almost every major airline, and for corporate aircraft fleets, the Army, the Air Force, paramedics and TV stations.

THE SECRET'S IN THE BURP

REFLEX charging employs a revolutionary patented charging concept. Unlike conventional constant current or pulse chargers, it continuously injects NEGATIVE/DISCHARGE pulses during the charging process.

A baby being bottle-fed must be burped to get rid of gases. Similarly, a battery accumulates gases across the plate areas when it is being "fed" or charged. By continuously "burping" (REFLEXing) the battery with negative pulses, larger charging currents can be used all the way to full charge with negligible battery heating.

RESULT

- Full recharge in 15 to 20 minutes (automatically less time with partially charged batteries)
- Vastly increased battery cycle life due to over 90% charging efficiency (reduced thermal and mechanical stress)
- Minimized battery memory (capacity fading)
- "Burp" Light indicates battery state-of-charge

SINCE 1929
CHRISTIE ELECTRIC CORP.

3410 WEST 67TH STREET
LOS ANGELES, CALIFORNIA • 90043
(213) 750-1151 • TWX 910-321-3867

Circle 102 on Reader Service Card

News

were 20%, satellite via land lines. In a 45-game baseball schedule our savings will average out to about 25% and we'll amortize the cost of our satellite in about five years."

Estimated savings projected by KBMA-TV for transmitting programs from various parts of the country according to Bob Wormington were: Oakland to Kansas City—63% vs land lines: From Boston-Kansas City—60%: From Toronto—Kansas City—26%; Baltimore to Kansas City—an $1100 savings: From Minneapolis to Baltimore—direct $1400 savings; via land lines from Chicago—an $800 savings and from coast-to-coast (New York-Oakland) a savings of over $4000 via satellite. All of the savings were based on a three-hour usage; the average time of a baseball game.

Mr. Wormington noted that if the independent stations were to become viable fourth network representatives, independents in the top 25 markets should have earth stations for effective distribution of available alternate programming efforts. "If we can serve the top 25 markets via satellite-earth station," said Wormington, "we can approach a true network status. If we can add a few of the network affiliates via our programming schedules in other markets we will have further expanded our potential as a possible fourth network."

Pointing out that the new "Operation Prime Time" programming concept, designed specifically for independent TV stations was "A giant step towards the development of an alternate network," Mr. Wormington said that this pioneering independent station programming effort, coupled with a mixture of top-level sports and other high quality program offerings, "could be the corner stone for attaining fourth network status for independents in the future."

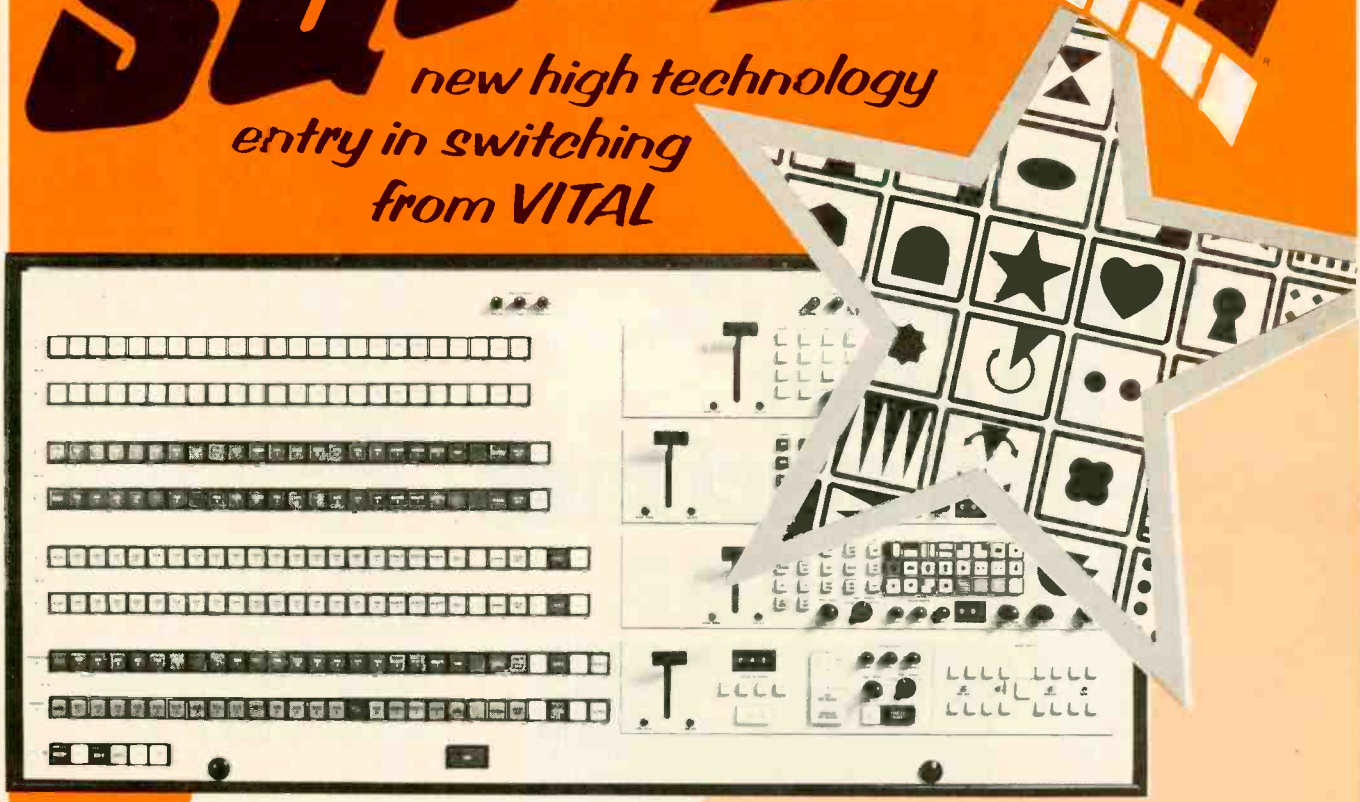
In addition to the need for more independent stations to invest in earth stations in the near future, Mr. Wormington also noted that there was a definite need for more transmission points on the part of the satellite operators. "RCA, for instance," said Mr. Wormington, "has only 6-up links and 4-down links in New York. 3-up and 2-down in Los Angeles, 2-up and 1-down in San Francisco, 1-up and 1-down in Houston and 2-up and 1-down in Atlanta. Chicago," he said, "is a major bottle-neck for distribution having only 1-up and 1-down link. There should be links available for each of the top 25 markets."

Bob Wormington also told the INTV convention delegates that there were

continued on page 10

squeeZoom

new high technology entry in switching from VITAL



VIX-114

- 12, 16, 20, or 24 inputs. 4 bus, 6 bus, 8 bus or more bus systems.
- All digital waveform and quad split generators.
- Digital key edging, border, shadow and outline available on all ME's.
- Vari-key. Soft, hard, shadow, or see-thru key.
- Digital quad split. Wipe or dissolve in each quadrant.
- Electronic vignette. Adjustable soft pattern edges.
- Superb linear chroma keyer. RGB or encoded.
- Automatic transition control on each ME.
- Ready to interface for computer aided operation.
- Many more state of the art and operational features described fully in series 114 brochure.

Do not fear to discover a superior product in the VIX-114 series switchers. Ask to see the demo tape for a sample of what we can do for users of switching equipment. You'll like it.

SQUEEZOOM® VMU-1

- Synchronizes up to 4 non-synchronizing NTSC color video signals simultaneously to studio sync.
- Continuously corrects variations in subcarrier phase from remotes or doppler effects from satellite transmissions.
- Full frame real time compression and zooming of pictures to any size.
- Joystick positioners place up to 4 compressed pictures anywhere on the screen.
- Microprocessor control for wider mode of operation.
- Real time freeze frame.
- Horizontal and vertical compression yield multiple effects.
- Zero delay in switcher.
- Eliminates tedious use of chroma keys in most cases.

PSAS*

***Production Switching Automation System**

Ask us what it can do for you.

HI TECHNOLOGY PRODUCT INNOVATORS

VITAL INDUSTRIES, INC.

MAIN OFFICE: 3700 N.E. 53rd Ave., Gainesville, Fla. 32601 • Phone 904/378-1581

MORRELL BEAVERS Midwest
2644 North Seventh St.
Terre Haute, Indiana 47804
Phone 812/466-3212

ROBERT McALL Northeast
34 Autumn Lane
Hicksville, N. Y. 11801
Phone 516/735-0055

GORDON PETERS Southwest
P. O. Box 912
Arlington, Texas 76010
Phone 817/261-6855

ERIC KING
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 104 on Reader Service Card

"few" technical problems to setting up earth stations once clearance had been given. "It took us about 10 days to set up our dish outside our station site," he said, "and when we went on the air carrying the ITNA news programs at the Republican Convention in Kansas City, there were few technical flaws, the picture was excellent and we had no trouble with the feed to the ITNA stations."

Mr. Wormington also warned the independent station operators not to wait for the smaller dishes people have been talking about. "The FCC has approved a small earth station antenna of fifteen foot diameter (4.5 meters) but it is not of broadcast quality," he said. "So be careful."

KBMA-TV, which acted as the Flagship station for the distribution of the ITNA news feeds from the Republican Convention was also the first TV station to telecast baseball games direct from Oakland to Kansas City via satellite as a part of its regular programming schedule. The station is also to add a transmit capacity to its earth station in Kansas City, which will make it one of three broadcasting stations so equipped.

INTV Convention Plays Host To Record Turn-Out

The Fourth Annual Convention of the Association of Independent TV stations played host to a record breaking outpouring of delegates, producers, syndicators and assorted suppliers during its three day run (Jan. 9-12) at the Fairmont Hotel in San Francisco and produced one of the most optimistic sessions the fledgling association has held to date.

The tenor of the INTV convention in the Bay City was set by its chairman, Leavitt Pope, WPIX-TV, New York, who noted that the initial gathering of independent TV stations four years ago, also in San Francisco, has grown "From a small handful to a membership of 48 stations, over 45 associate members and a convention registration of over 325 persons."

"In 1976," said Mr. Pope, "the independent TV station has come of age."

And come of age it has. Under the leadership of Herman Land, president of the INTV since its inception, the association has taken strong steps in asserting itself as a viable and important segment of the overall TV broadcast industry. It has made its presence felt in the FCC, the NAB and the Congress and its star-studded roster of speakers including FCC Commissioner Richard E. Wiley, Archa Knowlton, General Foods and Congressman Lionel Van Deerlin, Chairman of the House Sub-Committee on Communications, was a tribute to the muscle the new kid on the broadcast block is displaying.

The confidence and optimism of the independent TV station operator was evident throughout the three days of working sessions and the heavy hitters who appeared at the luncheon meetings were guaranteed standing room only audiences. There was little ducking out for shopping and sightseeing due to the tight scheduling and the action packed panels which were presented to the association were fully attended.

Perhaps the number one topic at the convention was "Operation Prime Time"—the programming concept which the independent TV stations hope will be the forerunner of a regular and continuing supply of quality programming which will enable the independents to compete equitably with the network affiliated stations in the prime time hours—8:00 pm to 11:00 pm. These are the hours independent stations have virtually abrogated to the networks except in rare instances.

"Operation Prime Time" was fully outlined by Al Masini, president of Telerep, Inc. and the man who was largely responsible for the development

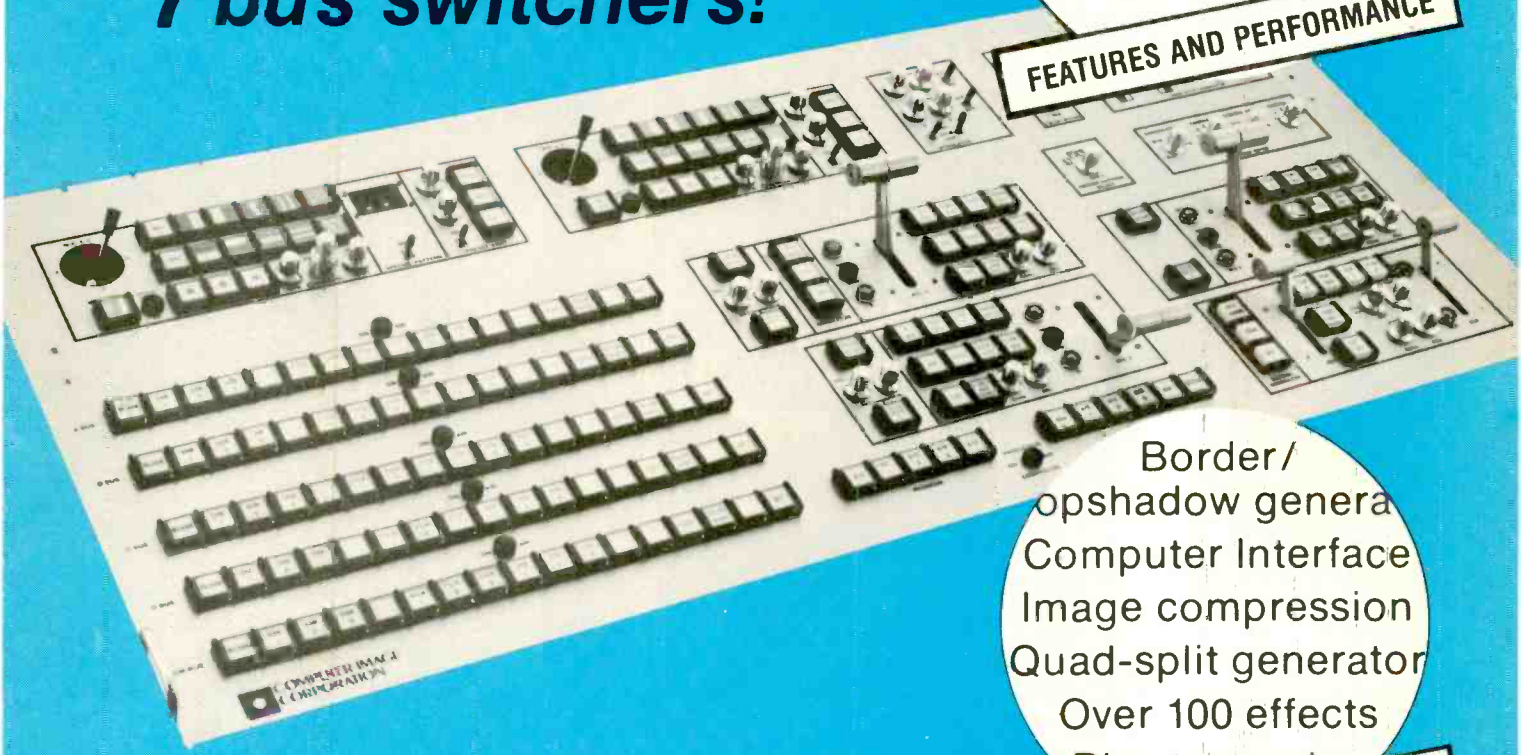
continued on page 13

COMPARE:

our 5 bus switchers with their 7 bus switchers!

Dual fade DSK
tical & horizontal Modula
4-level Posterization
neous on-air/Production c
4th level control capabilit
Mid-stream keying

FEATURES AND PERFORMANCE



Border/
opshadow genera
Computer Interface
Image compression
Quad-split generator
Over 100 effects
Rho-terry wip

AVAILABLE OPTIONS

EASE OF OPERATION

$$V = \frac{P}{C}$$

PERFORMANCE TO COST RATIO

Come see us at NAB booth 415-A (Hilton) ...and compare!

Why can our 5 bus video controller compete with other 7 bus switchers? Because the Video Controller's hybrid format allows full use of all buses compared to other formats that functionally disable up to two buses. It works so well that you could be wasting extra dollars on less efficient products. You care about the control of video...not how many bells and whistles your switcher has...and that's what we give you...the industry's finest Video Controller.

...and you ought to see our 7 bus switcher

the Video Controllers

EDITING, MASTER CONTROL, ENG, AUTOMATION and PRODUCTION

COMPUTER IMAGE CORPORATION

2475 W. 2nd Ave., Denver, Colorado 80223 303/934-5801

Ask us about our Broadcast animated video package NAB Specials!

Circle 106 on Reader Service Card

A CHARACTER GENERATOR FOR EVERY PURPOSE

ENG to Studio A

NAB '76--In case you missed us--We introduced the first microcomputer based character generator system to offer innovations such as 12 character sizes, color graphics, absolute centering and many other features surpassing the capabilities of other character generators costing twice as much.
Years of experience and a sympathetic ear to the market place combined with microcomputer technology enabled us to offer a character generator that met the professional's demands at a surprisingly low cost...In other words...MUCH MORE FOR LESS!!

COMMAND PERFORMANCE AT A REASONABLE PRICE

NAB '77--Don't miss us this time!!
Because we've expanded our Q series product line to include a character generator for every Purpose, Budget and Performance Criteria.

Features include: • 12, 24 or more Character Sizes (per font) • Color backgrounds, Characters and Graphics • Logos, Line Graphics, Time Display • Unlimited Random Access Memory • Universal EIA Synchronization -- Stand Alone — Upstream — Downstream with Matte • Compact Construction • Operational Simplicity • Self Contained Maintenance Program • And More!!

OUR Q SERIES CHARACTER GENERATORS DO IT ALL

Booth 701 Shoreham
(Bird Cage Walk)

SYSTEM CONCEPTS

SYSTEM CONCEPTS, INC.
395 Ironwood Drive
Salt Lake City, Utah 84115
(801) 486-3833

Circle 107 on Reader Service Card

of OPT from a concept to reality. According to Masini, who discussed the project during an appropriately titled panel session, "New Dimensions in Programming: The Fourth Market"—52 stations around the country joined in to commission the initial program development project; an eight hour movie that will be adapted from Taylor Caldwell's novel, "Testimony of Two Men." The mix of stations, both independent and affiliated network stations, includes 21 indies, 12 CBS affiliates, 11 NBC affiliates and eight ABC-TV network stations. MCA-TV, which will produce the movie, puts its overall cost at $4 million and the first of the mini-series is scheduled to make its debut on the 52-station network in May of this year. The mini series will be produced in eight hour-long programs at an estimated cost per program of $500,000 well in the ballpark for even the most luxurious network productions.

Al Mansini has claimed the Operation Prime Time effort, "a historic breakthrough of stations working together. It can be a prototype for a totally new source of first run, prime time quality programming." That the independent station operators have enthusiastically accepted the challenge to test the waters of quality production for their prime time periods there is little doubt. If Operation Prime Time succeeds in its purpose to provide alternate quality programming to prime time audiences, the potential of this alternate network and its eventual emergence as an acceptable and viable alternate advertising medium to the three networks could spell out new ground rules for a whole new TV ballgame.

In other developments at the INTV Convention, FCC Commissioner Richard Wiley announced an all out effort to bring UHF TV to a parity with VHF. He proposed a Master Control Plan which would include: implementation of comparability of tuning; enhancement of UHF signal quality in improvements in both transmitter and receiver; maximum utilization of UHF spectrum space allocated; identification of spectrum space needed and then preservation of this UHF space both domestically and internationally; an educational campaign to inform the viewing public about UHF TV and a financial commitment by the industry to fully develop UHF stations that are in operation.

In another area, Commissioner Wiley intimated that there was "little chance" for VHF drop-ins in the future and that the FCC was going to launch an inquiry into Network Program

continued on page 14

News

Policies.

CATV and its relationship with the independent stations was reviewed with pay cable getting the same icy reception from the indies that it also receives from its network affiliated brethren. Most indie operators, like their colleagues in other markets are ambivalent about the overall cable situation. When it helps them increase their revenues it's great; when it might hurt via market fragmentation, they holler loud and clear. Most major market independents, however, view the ever growing CATV subscription lists with a jaundiced eye and overtures by CATV officials with more than a touch of suspicion.

If there was one consistent theme throughout the convention atop Nob Hill, it was that the independent stations are on their way as an effective industry organization. They have enjoyed the fruits of two of the most profitable years of operation, they are on the threshold of an unprecedented new breakthrough in one of their weakest areas, the prime time periods, and they stand a good chance of becoming a major factor in an alternate, "fourth market" advertising experiment which could conceivably thrust them into a much more equitable competitive position with network affiliates. As Jackie Gleason used to say, "How sweet it is."

For the short term, Leavitt Pope indicated that the INTV had increased its budget considerably and that much of the increase would go to add a new research team to President Herman Land's staff. "We're planning on doubling our budget for next year," said Mr. Pope. The current budget ran slightly over $200,000. In addition to the research staff, Mr. Pope indicated a sales representative might be added for the Midwest area and that the fee for legal services to Pierson, Ball and Dowd, INTV's Washington attorneys would be increased. Major targets for 1977 include, according to Mr. Land, increased activities in Washington with emphasis on the protection of the "Exclusivity" clause, a lobbying effort in conjunction with the rewrite of the Communications Act of 1934 and a continuing effort to develop further programming for prime time to buttress the initial "fourth market" concept.

The general attitude of the INTV board, according to Mr. Pope, was 100% "Go" for 1977; and "go" the INTV members are going.

NBC Wins Olympics

The courting of the Soviet Union for rights to the 1980 Olympics is over.

continued on page 16

Panasonic Monitors make any cameras look good. Even our competitors'.

Why? Because Panasonic's new line of monitors have a lot more than sharpness, high resolution and exceptional picture quality. They're also versatile. Available in either desk-top or rack-mount versions. And in screen sizes from 5" to 19" (all screen sizes diag meas).

To start, there's our 5" desk-top WV-760 and triple rack-mount WV-763. Both with independent video and sync inputs.

For low-voltage cameras, there's the 9" desk-top WV-900. It comes complete with a multi-input and 24-volt power supply.

For a 9" desk-top monitor with 700-line ultra-sharp resolution, you want the WV-530C. It's also available in two rack-mount chassis, the WV-5301 and WV-5302.

If you want a 9" desk-top professional monitor that reveals all—even normal edge cutoff—you want the WV-5310. Complete with pulse-cross display and an audio system. And the WV-5310 is available in two rack-mount chassis: as the WV-5311 with a blank panel for a Tektronix® 528 waveform monitor and as the WV-5312 for two 5310's (excluding audio).

For a greater viewing area, there's our 14" WV-5400. It can be used as a desk-top monitor or rack-mounted with optional brackets.

For a professional 19" monitor that doubles as a VTR playback monitor, choose the TR-195M. Complete with UHF, RCA and 8-pin connectors.

But no matter which monitor you choose, there's one thing you can be sure of. One word can be worth a thousand pictures, when the one word is Panasonic.

For more information write: Panasonic Company, Video Systems Division, One Panasonic Way, Secaucus, N.J. 07094. In Canada, contact Panasonic Video Systems Department, 240 Ronson Drive, Rexdale, Ontario M9W 1B8.

Panasonic.
just slightly ahead of our time.

Circle 111 on Reader Service Card

Visit Panasonic at NAB in the Military Room at the Washington Hilton.

NBC, in a style suited to matters of state, broadcast live, via satellite, the signing of the agreement between the Soviet Olympic organizing committee and representatives of the network.

Estimates of the total costs for the broadcasts range as high as $82 million dollars. The American broadcast rights alone are around $35 million according to a Soviet official. Nearly a third of that money will be paid to the International Olympic Committee.

The only immediate cloud hanging over the deal is a threatened suit by Satra, The Soviet American Trading Company, based in New York, which came out of nowhere a few months ago to announce that it had reached an agreement to purchase the broadcast rights from the Russians. NBC, however, says that it has turned the matter over to its legal department and does not expect a serious challenge from Satra.

NBC was quick to point out that any agreement Satra might have thought it had with the Soviets would still have been subject to approval by the International Olympic Committee.

The negotiations for the broadcast rights have required a scorecard. The networks, ABC, CBS and NBC, all sent representatives to the Soviet Union in months past attempting to reach an agreement. The asking price from the Soviets was so high, $100 million, that at one point all three networks pulled out of the negotiations and asked the Justice Department to wave anti-trust regulations to permit them to pool their coverage and costs. Then came the Satra deal and some network officials just saw it as a scare initiated by the Russians to see if they could bring the networks back to the table.

CBS, claiming that there were just too many "imponderables" concerning the costs and profits that could be expected, finally announced their withdrawal from any Olympic deal, including the pooled coverage. That left ABC and NBC still working with the Justice Department on the pooled coverage approach. Apparently, private negotiations were still being conducted in Moscow by the nets on an independent basis.

Finally, NBC announced that they had the deal. The Soviets, in true enigmatic style, came back the next day with a denial and then followed the denial with a live broadcast of the actual signing. Could this be a sign of things to come? Henry Kissinger, where are you?

Indies Get Further "Fourth Network" Boost From O&M, B&B Agencies

Already fired up over the program plans for a mini-series to start in May—eight one-hour entries of Taylor Caldwell's "Testimony of Two Men" (see INTV convention story), independent TV station operators got another delightful jolt when representatives of Ogilvy and Mather and Benton & Bowles outlined another potential source of prime time programing, a fledgling "MetroNet" network which would provide 5½ hours of prime time programming to the independent stations seven times a week with a target date scheduled for October 1977.

"MetroNet" is a joint creation by the two New York advertising agencies on behalf of a mutual client—General Foods. The network will also be made available to other national advertisers however, but the primary target was General Foods.

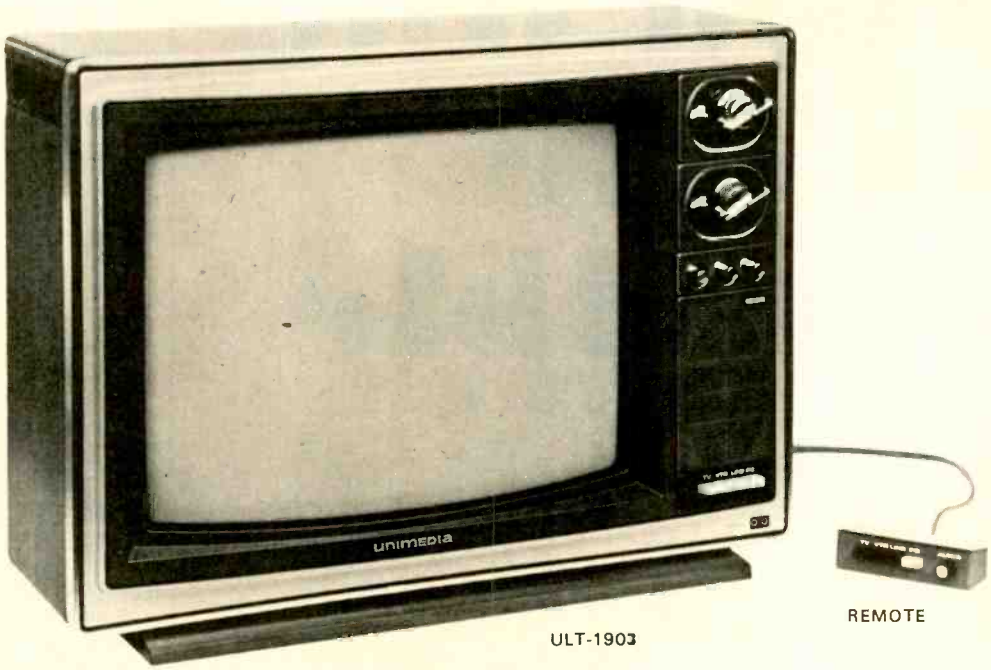
The programming, which will come as a welcome supplement to the Operation Prime Time experiment for independent TV stations, will be produced by Metromedia Television, which will also take over the development of the station line-up and act as the corporate entity for all contracts with advertisers and producers. The programs will be

continued on page 18

UNIMEDIA ULT SERIES

COLOR MONITORS AND MONITOR/RECEIVERS

NEW



REMOTE

ULT-1903

ULT SERIES STANDARD FEATURES

- THREE PUSH BUTTON SIGNAL SELECTION
- PULSE CROSS
- REMOTE CONTROL
- INTERNAL-EXTERNAL SWITCHABLE SYNC
- UNPARALLELED PERFORMANCE SPECIFICATIONS
- SONY *TRINITRON SYSTEM
- POSITIVE CLAMP DC RESTORATION
- "E" TO "E" MONITOR
- OFF-AIR VIDEO-AUDIO
- STATE OF THE ART "MOS" CIRCUITRY
- VTR INPUTS 8 PIN OR BNC—PHONE JACK
- POWER LINE ISOLATION GROUNDING CORD

Unimedia has combined the unique, ultra-reliable Sony *Trinitron Receiver with the most advanced, innovative state-of-art "MOS" circuitry available today.

The ULT Series provides unparalleled specifications and features in addition to sharper focus and greater brgihtness of the Sony *Trinitron Plus System.

Remote control functions are DC controlled. All functions except channel selection can be controlled remotely. Off-air recording is via "E" to "E". Chroma circuitry response is optimized for monitor and off-air operational modes.

*TRINITRON — TRINITRON PLUS
Trademark of Sony Corp

unimedia
unimedia
unimedia

22525 KINGSTON LANE, AUBURN, CA 95603 (916) 878-1250 (916) 272-1971

IMAGINATIVE IDEAS, SYSTEMS AND PRODUCTS FOR THE WORLD OF AUDIOVISUAL COMMUNICATIONS

Circle 113 on Reader Service Card

News

produced for the agencies and sold to the stations on a barter basis.

Archa Knowlton, director of media services for General Foods Corp., asserted that, "Assuming that the numbers work out and efficiencies and costs are in line, General Foods could be the advertising base on which the network could add other national advertisers."

New Satellite Service Authorized

The FCC has given its approval to begin a new satellite service to be operated by a company called Satellite Business System. The 5-0 approval from the commission opens the way for this joint venture between IBM, Comsat General Corp. and Aetna Life and Casualty Company, to begin developing the communications system with a $400 million investment.

The plan calls for the establishment of small rooftop earth stations for businesses and government agencies, constructed on their premises. The rooftop antennas will be used to send and receive voice, video and data grade transmissions. Tests using an earth station in Poughkeepsie, NY will begin shortly and when the system goes live, they will use existing satellites. New satellites, at least two, are in the planning stage.

If the system is successful, it could become a major competitor for AT&T in the lucrative business communications industry. AT&T and the Bell System both vigorously opposed the establishment of Satellite Business System.

FCC Briefs

The Commission has pointed out the **extreme danger run by inexperienced persons** who erect CB or other antennas on metal poles in the vicinity of overhead power lines—during the years 1973-76 more than 200 electrocution deaths occurred among people putting up such antennas, making grimly emphatic the need for care . . . . The FCC has approved the **"closed captioning" of TV programs** as an aid to those with hearing impairment; the system involves the sending of coded information during the vertical interval (line 21, field 1, and half of line 21, field 2, are assigned) which will allow the aural segment of the program to be displayed visually on the receiver screen, if a decoder is added to the receiver.

The broadcast **TV receiver antenna**

continued on page 20

20-1000mm.*

Whether you're the producer, director, cameraman or video man, field remote isn't getting any easier. Neither is big studio work.

Assignments are tougher. Production standards, higher. And schedules, shorter than ever.

As you can see, we've been listening: our new PV25x20B is proof. A single, rugged 22Kg unit that packs a lot of performance into a compact 546mm-long package.

Consider: A master-lens range of 20-500mm, with built-in 1½ and 2x servo-operated extenders, to give you complete flexibility with excellent relative apertures (1.8 @ 20-297mm; 2.7 @ 30-445; 3.6 @ 40-594 and 6.0 @ 1000). A short M.O.D. of 2.5m. Zero barrel distortion and vanishingly low pincushion. Plus manual/plug-in servo operation. And much, much more.

All at the kind of reasonable price that's helped make Canon the fastest-growing professional lens line in the world.

For more information, please call or write.

Canon®

Canon U.S.A. Inc. Head Office, 10 Nevada Drive, Lake Success, N.Y. 11040 (516) 488-6700
140 Industrial Drive, Elmhurst, Ill. 60126 (312) 833-3070
123 Paularino Avenue East, Costa Mesa, Ca. 92626 (714) 979-6000
Canon Optics & Business Machines, Canada, Ltd.,
3245 American Drive, Mississauga, Ontario L4V 1B8, Can.
Canon Amsterdam N.V., Industrial Products Division
De Boelelaan 8, Amsterdam, Netherlands

*PV25x20B is 20-1000mm in 25mm format.
P25x27B is 27-1350mm in 30mm format.

Circle 115 on Reader Service Card

News

rules have been amended to require the set maker to supply a UHF antenna whenever a VHF antenna is supplied, and to connect the UHF antenna whenever the VHF antenna is connected; the Commission further said that the UHF antenna must be one designed for, and capable of, receiving all UHF channels . . . . The FCC **refused to stay its new rule,** effective December 1st, 1976, which exempts stations with 10 or fewer employees from filing written Equal Employment Opportunity programs—a plea to rescind the exemption had come from the United Church of Christ and several other organizations.

Experimental earth stations to be used with the NASA series of Applications Technology Satellites (ATS) will be **licensed under Experimental Radio Service** (Research)—Part 5, the Commission announced; organizations wanting to set up such earth stations must submit a description of an experimental program with a definite, limited time period and with a limited scope and investment of funds, to avoid premature demand for the service and undue hardship when the service is terminated . . . . The Commission has **turned down a request from the Council on Children, Media and Advertising** (CCMA) for changes in the license renewal form relating to programming for children: in particular, the Commission will not redefine children's programming as that generating some minimum child audience level, but will keep the present definition: it is programming designed specifically for children.

The **deadline for comments in the "clear channel" inquiry** (see *BM/E*, August, 1976) **has been advanced** to April 25, 1977: broadcasters who have ideas about how radio coverage in the US could be improved (very-high-power clears? more stations on clear channels? etc.,) are urged to send them to the FCC, under Docket No. 20642 . . . . Another inquiry and proposed rule making concerns **further reduction of spurious and harmonic emissions from CB transmitters to decrease interference with television and other services;** in particular the FCC proposes to limit to 100 dB below the mean output all spurious and harmonic signals that are more than 250% off the center of the authorized bandwidth; comments are asked by March 2, but it seems possible this deadline will be extended.

Broadcasters are now **allowed to monitor the obstruction lighting** on antenna towers with automatic alarm systems, which alert licensees to any failures of the lights, under an amendment to the rules effective February 17, 1977: the previous rule was that broadcast licensees must log a daily observation of tower obstruction lighting (Report No. 14877).

News Briefs

The **Hughes Television Network,** recently acquired by Paramount Pictures, has increased its commitment for satellite time from 1800 hours to at least 5000 hours. The additional time was part of a $2.8 million contract signed with RCA American Communications . . . . **WNJT-TV,** New Jersey's Public Broadcasting Authority station, has been experimenting with **ways to reduce UHF transmitter power consumption.** A modulating anode pulser manufactured by RCA is used to apply pulses to the visual klystron amplifier tube of the station's RCA TTU-60 transmitter. Tests, to date, indicate a beam power saving of 32 kilowatts or 17.7 percent.

The NRBA Board of Directors announced that they will hold the organization's annual convention at the New Orleans Hilton, October 9-13, 1977. At the Board of Directors meeting, possible legal action against recent practices of ARB was considered and support of AM/FM radio all-channel legislation was discussed for the current session of Congress.

Sears, Roebuck and Co. has reaffirmed its policy that its commercials should not appear in programs "containing excessive violence or anti-social behavior" in a letter to its ad agency and the television networks. The action follows an accusation that the company is one of the nation's leading sponsors of violent programming on TV. The company states that of the 92 commercials it ran during the week the study was made which identified Sears as an offender, 90 of the spots were on programs not cited as excessively violent.

NYRAD (The New York Market Radio Broadcasters Association) has signed an additional six new member stations, a 65 percent growth for the organization. With its new strength, the organization embarked on a schedule of services which includes major sales presentations for advertisers, a series of monthly joint ascertainment meetings, a spring trip by station executives to Washington, D.C. to lobby, a golf and tennis tournament and a continuing program of promotion of radio as a prime communications medium.

Despite increased police patrols and other preventive measures, **vandals continued to use the antenna and tower of WHUD** for target practice at its remote location. Fed up with the damage, GM Francis V. Lough has started construction of his new home at

continued on page 22

At any other NAB Show booth it's 1977.

At Ikegami's it's 1978.

It should take you no more than minutes at the 1977 National Association of Broadcasters Show in Washington to elbow your way from any other booth to Booth 508, the Ikegami exhibit at the Shoreham Americana. But your brief walk will take you years into the future. Because the cameras and monitors and studio equipment you'll see in the Ikegami booth are years ahead in technology than anything you'll see. For instance, you'll see for the first time:

☐ **HK-312 studio camera with minicomputer and triax for remote telecasting and taping.**

☐ **The outstanding HL-77 self-contained ENG/EFP color camera with triax.**

☐ **New portable Ultra-Cam HL-51 full-scan one-inch Plumbicon color camera with triax.**

☐ **New HK-357 one-inch Plumbicon studio camera with triax and standard 19-inch camera control unit for low-budget, high-quality studio and remote telecasting.**

☐ **HK-309 announcer-booth camera, fully pre-set, servo-controlled.**

☐ **TK-950 tele-cine multiplexer for film and slide islands.**

☐ **New TM20-8 ultra accurate rapid set-up 20-inch color monitor that has to be seen to be believed.**

BOOTH 508
Shoreham Americana

Ikegami Electronics (USA) Inc.
29-19 39th Avenue, Long Island City, N.Y. 11101

Ikegami

Plumbicon is a registered trademark of N.V. Philips.

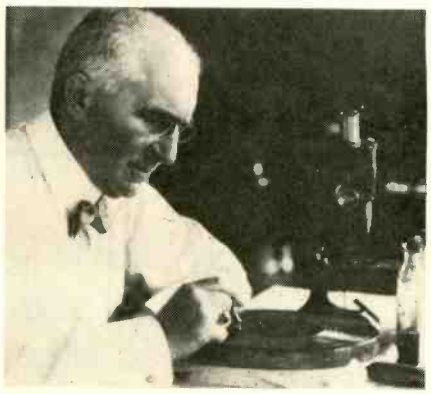
Circle 117 on Reader Service Card

News

the mountaintop location north of Peekskill, NY.

The Scripps-Howard Foundation is now accepting entries for the **1976 Roy W. Howard Awards.** The awards are given annually for public service by a radio station and a TV station. All radio and TV stations in the US and its territories are eligible except those owned by Scripps-Howard Broadcasting Company. No entry fee required . . . . Cinema Products Corp. will hold **maintenance Training Seminars** for the CP-16 and CP-16R, March 11-12, in cooperation with Photomart, Orlando, FL . . . . More than 70 percent of the available exhibit space for the **Los Angeles Videoshow** is already sold, according to Charles Tepfer, producer of the event, scheduled for May 4-5.

April marks the **100th anniversary of the invention of the microphone by Emile Berliner.** Mr. Berliner is also recognized for having given the world



the disc record and player, the method of mass producing discs from a single master, and the famous "His Master's Voice" trademark . . . . **The Midwest Acoustics Conference** will hold its tenth annual conference on Saturday, May 7, 1977, at the Norris Center of Northwestern University, Evanston, Illinois. "Sound Reinforcement" is this year's topic. Details can be obtained from Gary C. Schiff, William J. Sako & Associates, Inc., 500 West Central Road, Mt. Prospect, IL 60056.

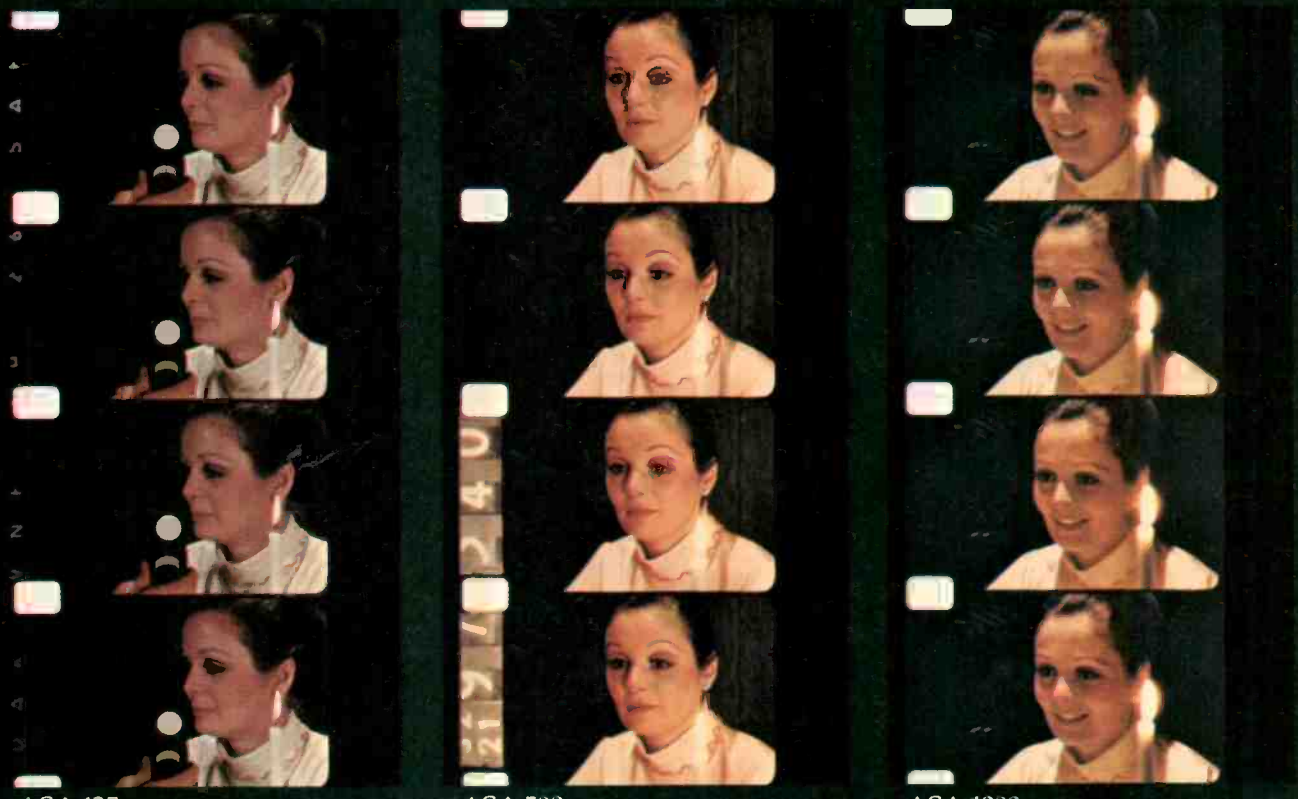
A study showed the proportion of **minorities and women** employed by commercial television stations increased by one percent in each group between 1975 and 1976. The study was conducted by the Office of Communication of the United Church of Christ.

A recent study by ComQuest Corp. indicates that by 1985 the **market for broadband communications services to business and industry will have grown** to $1.12 billion. Video telephone equipment sales will increase from its 1975 level of 400 units to a 1985 level of 23,900 units . . . . A poll

continued on page 24

The reality of 5 footcandles.

Unretouched filmstrips of the Eastman Ektachrome video news film 7240 (tungsten)



ASA 125
Normal studio lighting
160 footcandles, *f*/4
Standard process

ASA 500
6 footcandles, *f*/1.4
Forced 2 stops

ASA 1000
100-watt bulb 6 ft.
over model's head
5 footcandles, *f*/1.4
Forced 3 stops

Real life isn't always bright sunlight or floodlight. Sometimes, when you're on a terrific assignment, the light situation may be not-so-terrific.

Eastman Ektachrome video news film is capable of providing broadcast quality images down to 5 footcandles (with forced processing). And this can make the difference between picking up a good story beautifully—or having no story at all **EASTMAN EKTACHROME** Video News Film 7240 (tungsten), 7239 (daylight).

ASA 1000
2 candles
(not footcandles)
f/1.4
Forced 3 stops

Film is good news. Kodak

Circle 119 on Reader Service Card

News

of 722 television and radio stations throughout the country revealed that **nearly all receive more requests for public service time than they have time available.** In television, nearly 39% of all public service requests are turned down and in radio, nearly 42%. The most frequently accepted medium by television stations for PSAs is 16mm film and radio stations showed a marked preference for scripted announcements. The study was done by the Voter Education Project, Atlanta, GA.

Business Briefs

ABC has taken delivery on three AVR-3 recorder/reproducers from **Ampex Corp.** for use in the production of programs scheduled for introduction later this season . . . . **EUE Screen Gems** also announced that it had received five AVR-3s for use in its on-line computerized editing system and in color correction work and production.

Dick McKee, former general manager of KOB-AM/FM, Albuquerque, NM, has formed his own broadcast consulting firm, **Dick McKee and Associates,** in Albuquerque . . . . **Automation Electronics, Inc.** has opened offices at 1001 South Street in Lafayette, Indiana. The new firm will offer broadcast computer systems, including an in-house mini-computer system for business automation, priced under $30,000 . . . . **Shallco, Inc.,** of Smithfield, NC, has acquired the audio attenuator and open-frame rotary switch product lines from **McGraw-Edison Company.** The products have been sold in the past under the **Daven** name. Design and parts numbers will remain the same.

Collins Commercial Telecommunications Division of Electronics Operations, Rockwell International Corp., has received a $25.5 million contract from the **Corporation for Public Broadcasting** to provide an earth station system comprised of 150 to 165 stations for a nationwide satellite based TV system . . . . **Bosch-Fernseh** announced that it has sold about 80 of its TCN 1-in. systems worldwide and has also contracted to completely equip "Argentina 78 Televisora" for the transmission of its world championship soccer matches.

Twenty-two **Ikegami** color cameras have been purchased by **ABC** for their studios in Chicago, Los Angeles and New York. The cameras will be the HK-312 with add-on minicomputer features for set up and alignment . . . . **WEDW-TV,** Bridgeport, CT, will equip its new studio facility with **RCA**

continued on page 27

At NAB I'll show you an easy new way to measure IMD

INTERMODULATION DISTORTION MEASUREMENTS TO .001%

"If you'd like a really easy way to measure IMD, I'll show you one at NAB.

"I can measure IMD just by pushing a button. How's that for easy measuring?

"And I can switch between IMD and harmonic distortion measurements just by pushing a button.

"What's more, I can measure IMD as low as .001% in 3 seconds.

AVAILABLE IN BOTH S-T SYSTEMS

"The IMD feature is an option in Sound Tech's Total Harmonic Distortion Measuring Systems. You can have the option in both the Sound Tech 1700B and 1710A Distortion Measuring Systems. The IMD controls are all in this panel section I'm holding.

I'LL HAVE OTHER NEWS AT NAB

"I'll also have these other features to show you at NAB:

- Our 1710A System for measuring distortion in **balanced circuits.**
- Our Automatic Set Level feature that lets me (or you) make 10 distortion measurements in one minute.

"Come to booth 561 at the Shoreham Americana and say hello."

Rosemary

SEND FOR FREE INFORMATION

To:
SOUND TECHNOLOGY
1400 Dell Ave.
Campbell, Ca. 95008

Send coupon now and get the literature on this important measuring development.

Name _____

Firm _____

Street _____

City, State _____ Zip _____

Phone _____

SOUND TECHNOLOGY
1400 DELL AVENUE
CAMPBELL, CALIFORNIA 95008
(408) 378-6540

Circle 121 on Reader Service Card

THIS IS THE TUBE-
THE ORIGINAL 1¼ INCH PLUMBICON®
THAT WAS IN THE CAMERA
THAT REVOLUTIONIZED TV BROADCASTING
TEN YEARS AGO...

THIS IS THE 2/3 INCH VERSION OF THAT PLUMBICON TUBE... IT WILL CHANGE THE ENTIRE COURSE OF, AND ADD IMPORTANT NEW DIMENSIONS TO ELECTRONIC JOURNALISM.

Amperex®

TOMORROW'S THINKING IN TODAY'S PRODUCTS

A NORTH AMERICAN PHILIPS COMPANY

ered adequate in terms of consistency if the Top 40 records were played in a random pattern with assorted station jingles and a high energy newscast or two spread out during the hour. Refinement of programming has related directly to improved research techniques. Basic rating results were initially expressed only in total share of audience by the station, as in early Hooper reports. These were followed in acceptance by Pulse surveys which broke listenership into parts of the day, but still did not report on details of the actual composition of the audience.

Radio programming became really intense in terms of pseudo-science when Arbitron became a part of Control Data Corporation, and when computers began to play an ever-increasing part in research. Suddenly confronted with reports providing sex/age breaks into several categories from teens to 65 plus, it became possible for the first time for the radio station to be almost sure of being #1 in a selected category if it worked at all hard at some kind of a specialty.

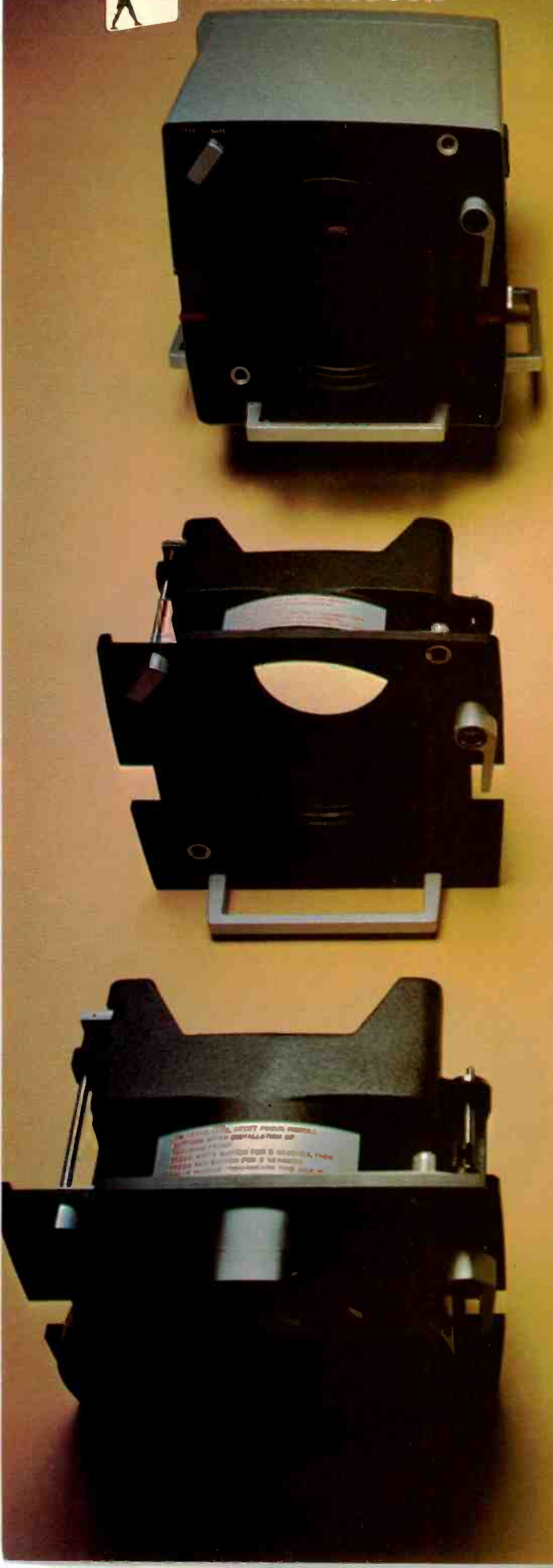
No longer did the average station in the average market have to stand back and watch the top rocker in the market walk off with #1 overall in numbers. Now with some beautiful music it would have a chance to be #1 in women 25+, or with all-news, it could be #1 in men 35-64, or it could win with some other combination of possible listener groups.

We are now at the point in programming where the inherent character of the entire exercise has radically altered since programming obviously selects the audience, and thus profiles the entire character of the facility itself. The individual play list of the music director in a contemporary music situation in one of the major markets may vary by only three or four current singles from that of another station in the market, and yet those three or four singles may cause the station to be perceived quite differently by the audience, particularly if incorporated with programming elements of a significantly different nature.

As Dick Starr mentioned in this magazine in January, elements such as contests and other framework items can make a great difference in the character of the service/entertainment rendered by the station, just as the quality of paper and the style of type may cause a significantly varied perception of the publication by the reader. Vital to this consideration of the ingredients which go to make up the character of an individual station is the audio processing employed by the station, particularly since the individual sound characteristics must be

continued on page 31

RANK OPTICS
TAYLOR-HOBSON



VAROTAL
MRL

The world's most compact lens and the world's most flexible TV System– it's all in the packaging

Whether you have standard or mounted portables, or both, you set the specification for what you want to achieve and then select from three front units. The main body of the lens stays the same—focal length 13 to 728 mm. It takes only seconds to change the front for:

Wide angle (52°—2°) copes with the studio and smaller outside broadcasts. (M.O.D.—2 ft.).

Narrow angle zeros in on those 1° shots and infinity closeups for outside broadcasts.

All purpose (44°—1.6°) (M.O.D.—4 ft.) economy version gives you a lens of broadcast quality and performance for utility shots.

Zoom and focus modules are quickly interchangeable for both manual and servo operation.

Varotal MRL—experience the economy, the standard of quality and performance that is yours with the quick change artistry of Taylor-Hobson. Call or write for literature:

RANK PRECISION
INDUSTRIES, INC.

260 North Route 303, West Nyack, N.Y. 10994,
(914) 358-4450

Circle 124 on Reader Service Card

SEE US AT NAB BOOTH 409 (Hilton)

RO-377

matched with great care to the particular audience which is targeted.

An audience selected by management and programming may well be as specific in a major market as men primarily 18-24 with secondary demographics of 25-34 and secondary sex target group of women 18-24, with a median of 22 to 23 for the primary demographic group. In this instance the programmer will be dealing inevitably with music of a progressive nature from albums as the primary source, and with an audience conditioned to the acceptance of very high levels of audio such as those of concert sound. Audio processing for this demographic target is totally at variance with that required for teen-appeal rock and roll, solid gold or standard chart personality MOR, not to mention the vast gulf which would separate this audio processing from that employed for all news, classical, beautiful music or country and western.

In many cases we encounter stations attempting to print a modern magazine on a Gutenberg press, attempting to compete as a contemporary music station while still using audio processing and control equipment left over from a previous format with entirely different audio characteristics. This never works, and yet engineering will many times take the blame when equipment designed for a completely different purpose proves improper for a new function in a format with vastly different dynamic needs.

It is now generally acknowledged that there is no single optimum installation for any radio station but there does not yet exist a complete understanding that there is as varied a need in terms of equipment to produce the best sound for a specific format. The precise tailoring of equipment to format, and of audio processing to audience objectives, is certainly a breakthrough which will extend to virtually all markets in the eighties after being confined to only the largest markets and the most successful stations for the past several years. Just as modification of dynamic content and aural image is in some instances undertaken to achieve a specific audience objective, employing an extensive array of well known and lesser known items of equipment drawn from the total world market, so it is that station programmers search ever wider areas in their attempt to achieve the highest level of audience and profitability.

The most common survey is Arbitron in major markets, with other reliable surveys such as NRI, Hooper and Mediastat providing verification and guidance for programming. With Arbitron providing quarterly surveys in the very largest markets, and with annual surveys being provided in approximately one hundred and fifty of the major markets in the nation, most stations are in some way affected by surveys from either Arbitron on a scheduled basis or by a special survey such as an NRI, provided on a contract basis to the order of a station in a particular market.

Programming to obtain the best possible representation in a survey has become increasingly important with each year, particularly since most major advertising agencies now employ wide computer assistance in all advertising placement. The future appears certain to see even greater emphasis on computer buying, and thus upon programming and engineering techniques which produce tightly controlled demographic results targeted toward a particular buying definition.

Station management will find itself ever more involved in the intellectual exercise required to position the station relative to the total market spectrum, and to working closely with both the programming and engineering departments to carefully craft the specific ingredients required to produce a sound and a product appealing to the segment of the market chosen. That will be radio tomorrow, like today, but far more demanding in terms of the level of refinement required, and far more rewarding in terms of the professional accomplishment which will mark the most successful broadcasters.

A general recipe for programming is no easy thing to achieve although there are certain absolutes which can serve as basics to any programming approach which has the ultimate goal of profitability. All too often the decision is made to change a format, to print a different kind of magazine, because a new program director or manager comes to the station. Time Magazine would hardly begin to compete with Cosmopolitan just because they happened to hire a woman editor, but all too often that sort of logic seems to be used in radio programming. A new man has done country music in Rapid City and soon the station is changing to country music in Palm Beach, without any sort of supportive marketing research to indicate a public desire for the addition of this programming to the spectrum. Illogical . . . . but one symptom of the problems created if programming is not approached in an orderly and logical basis.

Here is a brief general outline of a more systematic approach:

1. Determine the need for the product to be manufactured, the sound. Does the nature of the market demonstrably require the addition of the proposed program elements to the total spectrum?

2. Evaluate the ability of the technical facilities to provide an overall sound appropriate to the proposed format. Studios, automation, production equipment and special effects gear, individual elements of the audio chain, and final sound of the combined elements must match the program goals of the station or all is surely doomed to failure.

3. Staff matchup with format objectives must be complete, too. It simply does not work to attempt to achieve great things with hostile people. Enthusiasm is the single most important ingredient in radio programming, and in ultimate profitability. In order to be enthusiastic a staff must communicate happily first with each other and ultimately with the audience.

4. Environment compatibility must be achieved, particularly in the ever more sophisticated world of tomorrow's broadcasting. The age of creating great radio with junk equipment and tiny little work areas is past, because the station you compete with will probably have the right tools for the job and will make you sound foolish and inadequate on the air unless you match their professionalism in every detail. Ergonomics, the science of matching the human to the work area, is every bit as vital as the psychoacoustic conditioning of the sound elements. The engineer must know precisely how much equalization or compression to apply in a particular instance and equally well how to create an environment conducive to optimum work product from the station's performers.

5. The single element of overriding concern must be an ever increasing concern with absolute quality. Every time another good stereo receiver is sold, the audience gets another tool with which to grade the radio station. Five years ago their little tuner and a couple of cigar boxes from W.T. Grant didn't tell them much about how well you had your audio problems solved, but today's often excellent equipment is falling into the hands of literally millions of listeners who have been trained to hear good quality in audio. Without high sound quality there will be no audience for programming, no matter what it has to say to the audience in terms of content.

6. As mentioned earlier in a different context, the matching of every element of technical audio handling to the precise needs of a particular format type will be the final deciding element in many competitive situations. One single item in an audio chain composed of perhaps ten individual elements may be matched to a different need, to a format type removed from that employed by the station, and that

particular element will so color the sound of the station that it will lose creditability with listeners on a subliminal level. Listeners will repeat the station on the sensory levels at which most pleasure decisions are made.

Thus a broad awareness of every item of audio equipment, and of the effects of that item on the total sound, will be the certain mark of the engineering personnel who boost tomorrow's radio stations toward the highest levels of programming for service, success and profit.

Are You Ready For The May 1st Non-Duplication Deadline?

Six Stations Show Six Ways To Do It

ON MAY 5, 1976. The Federal Communications Commission issued its latest fiat restricting duplication by commonly-owned FM and AM stations in the same market area. The result, at first glance, is that duplicators are going to have to come up with a lot of new programming on or before May 1st, 1977, the effective date of the latest rule.

But a survey by *BM/E* of a representative group of stations affected by the new rule suggests that there is a wide flexibility in the way a station management can come up to these new responsibilities. The actual amount of new programming needed can range from quite little to quite a lot; but in the latter case, it may well work out that the station has opened new profit potentials, too.

Thus every station management has the chance to work out a plan that has a positive effect on operations, or at the very worst, will have a minimum, easily absorbed result.

First, here is a quick recap of the new rule. If either the AM or the FM station is licensed to a community of over 100,000 population, says the FCC, the FM station may not give more than 25% of the average week to simulcasting. If either the AM or the FM station is licensed to a community with more than 25,000 but not more than 100,000 people, the limit on duplication by the FM station is 50 percent of the average program week.

Further, on May 1st, 1979, the 25,000 to 100,000 stations must drop to the 25% limitation.

There is no exemption for day-time only AMs that are jointly owned with FMs. But the amount of duplication during any one week can go up to 40% (in the 25% "zone"), if the *yearly average week* stays at 25%. "Duplication" is defined by the FCC as playing the identical program within 24 hours on the two stations. This opens the way for a wide variety of program shifts to avoid breaking the rule.

The FCC in its order gives a fairly lengthy discussion of the original reasons for duplication and the reasons that this basically "wasteful" use of the spectrum no longer seems necessary. As everyone can see, FM in the last three years has surged ahead commercially and is now on a par with, or even ahead of, AM in a number of markets. So, the FCC concludes, it is no longer necessary to nurse FM along: it can stand on its own feet.

This growing up of FM is an accepted fact. Additional evidence for it lies in the number of AM-FM stations that were once duplicators and are now separately programmed by choice of the managements.

In a quick sampling, *BM/E* discovered that a large proportion, perhaps 50%, of combo stations that were duplicating three years ago have been on separated programming for considerable lengths of time.

Here are stories of a half-dozen combo stations that went separate fairly recently, or plan to before the May 1st deadline.

KMEO, Phoenix. This is a day-time-only AM station, and a subscriber to the Bonneville syndicated programming. J.B. Stephens, program director, will get to the 25% limit by using different segments of the Bonneville material in such a way that only 50% of the day is on simulcasting. Then when the all-FM nighttime hours are added, the total for the 24 hours comes to 25% duplication, 75% non-duplication—compliance with the rule.

WBBQ, Augusta, GA. Ed Dunbar, general manager, has a Harris System 90 automation system. He uses "contemporary" music, in programming the station staff itself assembles. He will get to the 50% limit, from his present 100% duplication, by separating the two stations after 6 PM (they will continue to simulcast during the day). Because the automation system is used on both stations, the program separation will not require any notable staff expansion; a few hours more by the present staff will do it. The potential of separated billing for the evening programs gives him the strong hope that the station will come out ahead, rather than losing.

KTCS, Fort Smith, Arkansas. Stan Steel, program director, has been using country music on both AM and

continued on page 34

audiopak A-2
BY CAPITOL

The broadcasters' choice for reliable playback.

The Audiopak®A-2 by Capitol® Broadcast Cartridge.

Broadcast engineers rely on Audiopak® A-2 Cartridges for good reason. All of the major components are assembled to get you from point A to point B. With efficiency and precision. For example, the constant-force, foam pressure pad assures unvarying head to tape contact over the life of the cartridge. The positive, non-slip brake mechanism locks the tape, rather than the hub, assuring accurate cueing and timing. The strong durable housing is yet another factor contributing to its reliability.

And to assure you of premium performance, each cart is individually tested —100%—for wow and flutter, electrical output, tension, and other properties. And because we manufacture the entire package—from tape to packaging—we can assure you of the highest possible quality control.

After all, no other tape manufacturer knows professional recording and duplicating needs better than Capitol.

AUDIOPAK® A PROFESSIONAL PRODUCT MANUFACTURED BY THE SAME PEOPLE
WHO MAKE AUDIOTAPE,® AUDIOFILM,™ AUDIODISCS® AND THE LEARNING TAPE™ BY CAPITOL.®

audiopak
BY CAPITOL

Capitol™ CAPITOL MAGNETIC PRODUCTS A DIVISION OF CAPITOL RECORDS, INC., 1750 NORTH VINE STREET, LOS ANGELES, CALIFORNIA 90028

Circle 126 on Reader Service Card

Radio Programming

FM for a number of years, with excellent results. However, the station has built new studios (with a planned February 15th opening), and the new set up includes complete automation for the FM station, in anticipation of the non-duplication era. Steel is shopping for syndicated programming for the FM station (probably the decision will be made before this sees print). Automation-plus-syndication is one of the most frequent responses to the non-duplication rule.

Steel adds a comment that has been made a number of times in station reports on various occasions, but is important enough for frequent repeats. He knows that with his syndicated programming he must continue, or even increase, his local news and other "community" efforts. The station has to build the strongest possible identification with the community to stay on top.

WKTZ, Jacksonville, FL. This station has been using separated programming for some time, with Bonneville beautiful music on the AM and Schulke beautiful music on the FM; and both are doing extremely well. This undoubtedly reflects the make-up of the audience in the Jacksonville area: it is skewed in the direction of older listeners. It draws attention to the obvious fact that a station's market situation will have primary weight in its non-duplication planning.

WMAS, Springfield, Mass. Program director Brooks is already at the 50% non-duplication level with his "contemporary MOR" programming which the station itself puts together. This means that the staff is already accustomed to arranging material to form two separate lines of programming. Brooks says he expects to hire two more people to get to the 25% level. These will be on-air personnel; the programming staff will readily supply them with the extra line of material, drawn from the station's present programming sources.

KOOO, Omaha. Faye Graves, general manager, is operating a daytimer on AM, 24-hour FM. Both have been getting the same country music, with excellent profitability for the station. With separation, he plans to keep essentially the same country on the AM, to go to a more "modern" country on the FM. In both cases, the programs will continue to be put together and broadcast by the station's own staff. That will mean hiring six to seven new people, mostly on-air personnel. But the additional cost, says Graves, will likely be more than recouped by the separation of billing for AM and FM spots: now time on the two stations is sold as single time. This will also accord with the fact that FM has been gradually taking the audience (as it has in so many markets) and billing it separately will allow for rates that match the new situation.

Which leads directly to a concluding observation: FM non-duplication will mostly be a stimulus and an opportunity for the broadcaster rather than a burden. It will stimulate those who have not already done so to begin cashing in on the new potentials of FM, high and rapidly going higher.

BM/E's Program Marketplace

Syndicators For Radio

Schulke Radio Productions, Ltd.

3001 Hadley Road, S. Plainfield, NJ 07080. Tel: 201-753-0444

Jim Schulke, founder and president of Schulke Radio Productions, is one of the pioneers of syndication. Although he disavows the *origination* of the "beautiful music" idea (it was on a few stations well before he took it up), he can take credit, along with Marlin Taylor and his associates at Bonneville (see *BM/E*, January), for making beautiful music a major, nation-wide element of radio broadcasting.

On a rough count, between 400 and 500 AM and (mostly) FM stations are now on beautiful music. Of these, about 70 are currently SRP subscribers. Most SRP stations, however, are in the large markets, so that SRP's share of the national audience is much higher than the station total suggests. Schulke, a man to be listened to on this subject, says that something like 25% of the total audience are potentially beautiful music listeners (more below on who that 25% are).

Beyond the actual stations and listeners reached by Bonneville and SRP, the example of their success was most important in the spread of beautiful music after 1970-71. Schulke's success is impressive in financial terms. Although a handful of syndicators have larger station totals, Schulke's rates are higher than the industry average and his gross in 1976 was, as far as *BM/E* can determine, the highest in the industry at about $1,550,000. SRP

continued on page 36

the AMERICAN DATA 558-1

NEW FOR '77!

VISIT US AT THE NAB FOR A DEMONSTRATION SHERATON PARK: BOOTH 101

The 558-1 is a compact video processor that provides small studio and remote van operators with production capabilities found only in large studio systems. *Four Channel Parallel Video Processing* allows mix, wipe, luminance key, and chroma key functions to be performed *simultaneously* on a single mix/effects amplifier. This *revolutionary approach* to video systems flexibility is a continuation to the fourth generation of production switchers *pioneered by American Data.*

standard features:

- Nine primary inputs, including blackburst, plus five external key inputs.
- 100 soft wipe patterns, including rotational wipes; H and V multipliers; pattern positioner; pattern modulator, soft bordered wipes.
- Spotlight with 0-100% variable attenuation.
- Three independent key processing systems.
- Adjustable rate key blink; key invert.
- Two independent color matte generators.
- Full camera tally.
- Available for NTSC, PAL, PAL-M standards.

options:

- One Bus Quad Split.
- Linear RGB chroma keyer and camera input selector.
- Two key edge generators.
- Third color matte generator.

AMERICAN DATA

401 WYNN DRIVE • P. O. BOX 5228 • HUNTSVILLE, ALABAMA 35805 USA • TELEPHONE 205 887-5180 • TWX 810 726-2125

ADC SOUTHEAST
705 Bowie Blvd.
Orange Park, FL 32073
904-269-2544

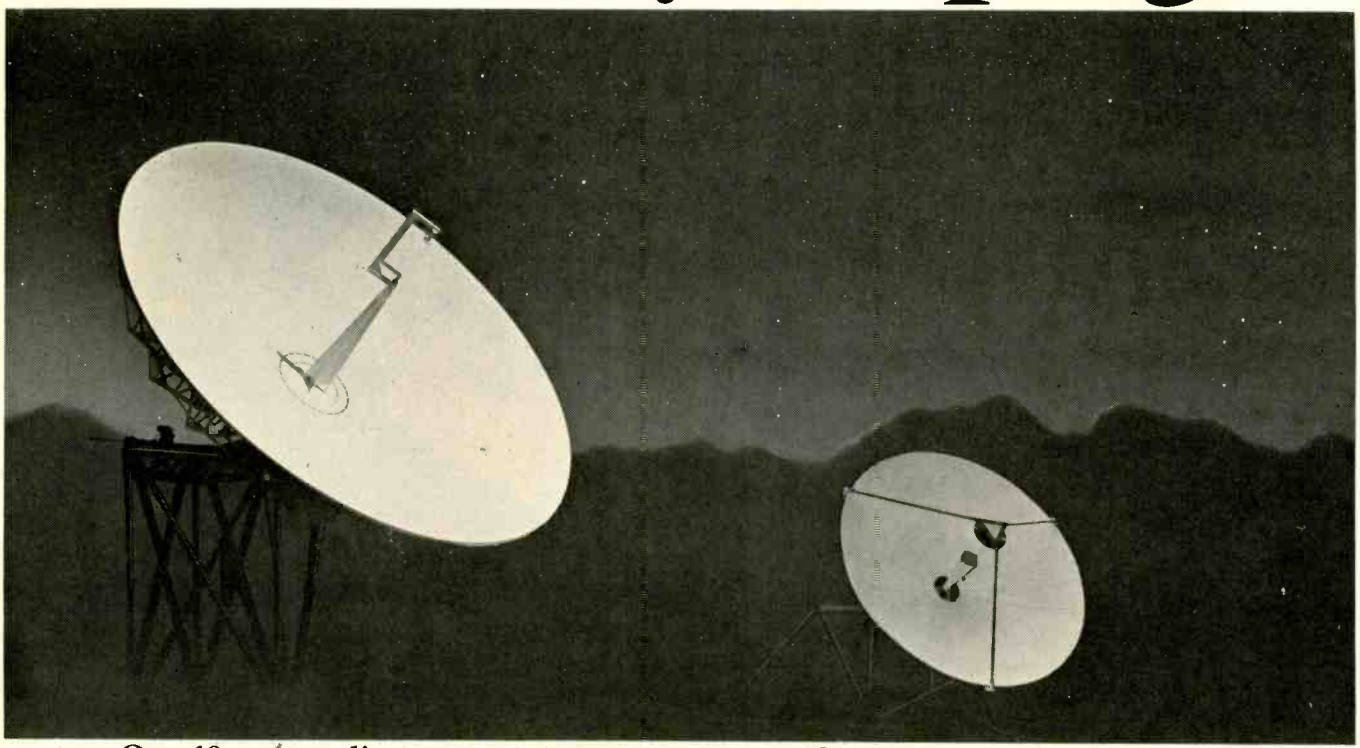
ADC MID-WEST
233 West Hill Ave
Glenn Ellyn, IL 60137
312-469-6200

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

ADC WEST
445 S. New Hampshire
Suite 301
Los Angeles, CA 90020
213-387-7756

Circle 128 on Reader Service Card

We can size you up right.



Our 10-meter diameter antenna. **Our 5-meter diameter antenna.**

At Scientific-Atlanta we are in production on both 5- and 10-meter receive only and receive/transmit earth stations. The 10-meter antenna pioneered the way for satellite distribution of programming for the broadcast industry.

Our 5-meter receive only has been designed and engineered utilizing proven technology gained from supplying over 70% of the industry's earth stations.

Only an analysis of your total requirements will tell you which antenna size to choose for your area.

To size you right, we'll put our 25 years of experience in telecommunications to work for you by preparing a complete analysis of expected system performance. Based on the application of the earth station and upon reception at your location, it will compare system noise temperature, G/T, S/N and C/N characteristics between a 5-meter system and 10-meter system. And the difference in costs can be compared as well, all to help you make an intelligent buying decision.

So before you buy anything, let us help you make the right decision. Our commitment to the broadcast industry includes a nationwide network of service locations where emergency help is available 24 hours a day.

By sizing you up right, we won't let you down.

For more information and an in-depth analysis, please call Ken Leddick at (404) 449-2000. Or write us.

Scientific Atlanta
Communications

United States: 3845 Pleasantdale Road, Atlanta, Ga. 30340, Telephone 404-449-2000, TWX 810-766-4912, Telex 054-2898
Europe: Hindle House, Poyle Road, Colnbrook, Slough, SL30AY, England, Telephone Colnbrook 5424/5, Telex 848561
Canada: 678 Belmont Avenue West, Suite 103, Kitchener, Ontario, Canada N2M-1N6, Telephone 519-745-9445, Telex 069-5239

Circle 129 on Reader Service Card

charges $800 a month in the smallest non-rated market, $1000 a month in the smallest rated market; the range is up to $6000 a month. Most syndicators operate with minimums of $400 to $500 a month.

In addition to high fees, Schulke demands or cajoles from his clients a very high level of technical and managerial performance. He gets, for example, the contract right to cancel out if a station runs more commercials than the maximum he specifies. He is fanatical about a number of technical matters. Tape playback equipment, the whole audio line, has to be up to top standards. RF and antenna equipment must be adequate to the coverage the station needs for success.

Schulke insists that his technical and managerial demands are not personal hobby-horses but are essentials for station and programming success that have come out of hard experience. He has a basketful of stories to show this—a few are recounted below. He says his few station failures have taught him extremely valuable lessons which he is constantly passing on to clients in the form of recommendations or demands.

But failure is a rare event for SRP as is clear from the latest Arbitron sweeps. Of SRP's 70 clients, no less than 24 were No. 1 in their market of all AM and FM stations, and only four were lower than third. What are the elements of this success and what can we learn from them? First, there is Schulke himself; then, there is the music; and, finally, there are those technical ideas which come out as a basic part of the Schulke performance.

On his way to becoming a seminal figure in syndication of programs for radio, Schulke had a great variety of careers. But, unlike the standard hard-knocks route for actors, novelists and such—lumberjack, car hop, merchant seamen, etc.—the Schulke adult education was success-prone from the start. Here are highlights:

- Harvard Business School (graduated); Radio and TV presentations, Young and Rubicam;
- Agent for radio and TV shows (sold many);
- Went to Hollywood because, he says, he saw the movie period coming for TV—executive jobs in movie companies;
- Ad manager, Magnavox (got deeply involved with music);
- Vice president, programming, then general manager of TV station KTLA—raised billings from $4 million a year to $8 million—tried to buy station, couldn't raise the money.

Although the KTLA stint did not bring what he wanted at the time, it reinforced a long-standing notion that he wanted to do something creative in broadcasting. This was 1966-67; FM stations were just coming into the big-city ratings and Schulke studied a number of successes to analyze how they did it. WDVR in Philadelphia, the first FM station to bill $1 million in a year, was using an early form of "easy listening."

By 1969, Schulke had put together his own ideas on "easy listening" and was ready to go on his own. He hired Phil Stout away from WDVR as collaborator and went on the road to sell the service. In 1970, his take was $66,000; in 1971, it was $220,000; and it has jumped every year since to reach 1976's $1,550,000.

In his *BM/E* interview, it soon became clear that Schulke combines a quick ebullience and creativity with a capacity for intense concentration on detail. This concentration applies first and foremost to the music itself. He and Phil Stout still personally choose every piece of music that goes on an SRP tape. It is not only the music, but the sequence of numbers that is vital to the program's quality, and it gets unremitting attention.

What the music is and who it is for

That sequence comes under the heading of "matched flow," the quality of seamlessness that nearly all syndicators of beautiful music claim for their programs. Schulke says that his "flow" has a carefully scheduled up and down, a variety that intrigues the listener, while the consistency of the overall sound holds him. As compared with most other "matched flow" formats, Schulke claims his is more consistent. No number breaks out to shock the listener; there are no sonic or rhythmic explosions to knock him off his perch. The music is pleasant, warm, alternately exciting and soothing in a careful sequence.

Schulke says that not nearly enough music of the quality he wants is being produced in this country. Last year he signed up for more than $200,000 worth of music originally produced by the BBC for British audiences; he also underwrote the recording of a large quantity of music especially for SRP by British orchestras. He believes that his large backlog of program material makes him unique in the industry.

Obviously, the choice of a music format means the choice of a particular part of the listening audience. The sock 'em music, as is generally known, is aimed for the highest "cume"—the largest number of listeners during each quarter hour, and they will be mainly very young list-

continued on page 38

Radio Programming

eners. This is the audience segment for advertisers with youth-oriented products to sell.

Schulke has opted for a different audience, one that stays with the music for a good part of the day, is older, perhaps better educated. He is especially interested in a particular listener: the young adult woman, housewife or worker or both, who has grown up through her "rock music" years and has reached a settled relation to her life. This young woman, says Schulke, will be faithful to his kind of music, if it is really intriguing, has variety and spirit. Moreover, she will pin the men in her family to the music. The men are too volatile; without some anchorage, they tend to bounce around among rock, country, beautiful music, etc. according to the impulses of the moment.

Super-fidelity for feminine ears

This young adult woman who is Schulke's main target is also the main stimulator of his intense concern with technical matters. Women, it has been established for many years, are far more sensitive to distortion in reproduced sound than men. But the women are totally uninterested in verbalizing their experiences or in seeking out the causes: the conscious pursuit of high fidelity is, paradoxically, 95% a male phenomenon. The women express their sensitivity by simply turning off sound they don't like.

To keep the young women from doing that to his programs, Schulke has dug fanatically into every aspect of his technical performance, and has ridden station managements unceasingly. He says he did not start out with such high intensity about technical matters. In 1973, although his business was growing by leaps and bounds, he became aware that he was not holding on to his listeners as firmly as he would like. There were three possible areas of trouble: poor performance by the station; the wrong music; poor technical performance on his part. The most painstaking analysis led him to the technical quality of his tapes.

Thereupon he started a research campaign, not yet finished, to isolate the technical factors in listenability. By 1975, a number of important findings had been given effect and, by spring 1976, nearly all extant tapes were on what he calls his "new sound." The fact that the spring 1976 sweeps were a fantastic success for SRP gave a resounding "yes" to his technical efforts.

In November of 1976, SRP moved into a new $400,000 home in Plainfield, NJ. Here Schulke does all his program assembly, mastering, and duplicating on facilities of his own design. Having an integrated operation allows him to control every part of it, and also allows expanded research into technical requirements.

One of his main findings is corroborated from many sources: highly trained ears can hear differences in reproduced sound that none of the standard instrument tests so far designed can isolate. He has come to rely on his own ears and those of Stout for final judgment on taped material. Beyond that, Schulke naturally regards some of his more abstruse findings and technical procedures as proprietary.

However, the main outline is like a hi-fi credo: the material on the tapes must have a flat, *really* flat, frequency response from very low to very high; any form of harmonic, intermodulation or phase distortion must be in the low decimal range; every effort must be made in mastering and duplicating to preserve the full quality of transients.

These ideas, as suggested, will not startle high fidelity enthusiasts, but the percentage limits Schulke aims for do startle many station managements. After the music comes through the station's audio line and transmitter, and through radio receivers that include many $39.95 portables on kitchen shelves, how can 2 or 3 dB of unevenness, say, make any difference?

Schulke has a number of specific case histories to prove that his technical standards can make all the difference. A station in one of the large markets, using SRP programs, had dropped unaccountably from high in the ratings to No. 5. Schulke discovered on his trouble-shooting visit that a limiter of a kind he disapproves (because of high distortion) had been put on line in spite of his recommendation against it. He delivered an ultimatum: choose between SRP and that limiter. The limiter came out and the station climbed to No. 1 in the next ratings.

Schulke regards unsolicited telephone calls as a very sensitive ongoing measure of audience response. All Schulke stations keep a log of such calls. They will be 95% positive for the music, and they supply a day-to-day index of audience acceptance. In one case, in a large midwestern market, the Schulke subscriber was No. 3 in the ratings and the management was pleased. But very few phone calls were coming in from adult women, and that gave Schulke uneasiness about the future.

His investigation uncovered the fact that the signal level going into the limiter was 5 dB higher than the maximum he had recommended. A strong

plea to the management got the chief engineer overruled and the signal level down. The next week the calls from young women zoomed up to parity with those from men.

Naturally, when the new integrated plant was built, Schulke was able to incorporate many design features that gave effect to his technical ideas. Many amplifiers, for example, were built especially to his design, since he could not find any that fully met his requirements for certain jobs. Audition rooms have elaborate acoustical design to eliminate room effects that would obscure the quality of the program sound—the room has to be very "flat" if the sound is to be judged by ear. The building and many of the interior partitions are of super-massive concrete to reduce noise to extremely low levels.

In personnel, too, Schulke has equipped SRP for high efficiency. In addition to Stout, the executive staff includes David MacFee, who had been program director of WRTH in St. Louis, and later of the Sudbrink group of stations. MacFee consults with SRP clients on day-to-day program execution, including such things as IDs, jingles, the quality of commercials, promotions, etc. He is a main route for transmittal of operating experience among SRP clients—what works and doesn't work for various stations. MacFee has been with SRP for a number of years.

More recently added is Bill McClenaghan, who came from a post as vice president of Arbitron, and who heads up SRP's sales, which includes general analysis of a station's technical and administrative positions, competitive situation, etc.

A new format for SRP?

With this view of an operation well equipped and well manned, *BM/E* asked Schulke the obvious question: will SRP introduce a second format? Most syndicators have anywhere from three to six.

Schulke says he and his associates *are* working toward another format, but just when, or even if, he will take the plunge is not yet sure. It will probably be aimed at the AM station that used to do well as No. 2 or No. 3 in the market, but has been pushed out of the money by new FM stations in the area, or by some other change in the market. Schulke says his new format will be designed to help such stations get back to profitability. He says it will cost him from $300,000 to $400,000 to launch a format, with the careful preparation and pre-testing he wants.

Whatever the new format is and whenever it comes, it will start out with high advance credit drawn from Schulke's great handling of beautiful music for SRP. **BM/E**

TELEVISION

PROGRAMMING & PRODUCTION FOR PROFIT

WITI-TV: Local Production Is Productive

WITI "Live Camera" crew on location for swimming competition. Video is microwaved back to the station for recording on 2 in. machines.

Newton Minnow's "vast wasteland" may blossom yet as local stations take imagination and combine it with the latest technology to begin to produce programs that are not only entertaining and informative, but also profitable. The story of "Champion Teens," produced by WITI, will hopefully spark more attempts of this type by other broadcasters looking for profitable and effective ways to bring their audiences better television series.

IN MANY MARKETS local stations view production as a not very profitable necessity. With the advent of ENG equipment, however, stations have entered the commercial production field and found it profitable. This gives local stations essentially two profitable types of production, commercials and local news. Whatever remained of local production was usually in the public interest, necessity, and convenience category.

WITI-TV, Milwaukee, has changed all that. Last summer Jim Behling, operations manager for the station initiated a local programming effort called "Champion Teens" that was soldout to local advertisers and a national account for the week run of this mini-series.

The concept was simple enough. Behling was impressed by the success of ABC's "Superstars" competition and believed that WITI could produce a similar program.

"Rather than go around and try to find local superstars from the Milwaukee Brewers, Bucs, or the Green Bay Packers, we thought we'd try to get a program involving youngsters," said Behling. Eventually, WITI lined up twelve all-conference athletes from six southeast Wisconsin high schools.

The technical set-up was effective and cost conscious. Behling estimates that the six half-hour programs cost about $5000 to produce—less than $1000 per program.

The format called for the atheletes to compete in two groups, first the six football players and then the six basketball players. Each group participated in a series of events such as bicycling, golf, canoeing, swimming, basketball, and the 440-yard run. Individual winners eventually competed in a series of semi-finals until an overall champion teen was selected. All of these events were covered with a single RCA TKP-45 portable camera.

Naturally, use of a single camera made staging the event properly a critical problem. The locations for the events were carefully scouted and judged on various criteria including the availability of an adequate site for the remote microwave truck. The intention was to microwave all of the video and audio back to the studio where it would be recorded on 2 in. tape. As a back-up, the signal was also recorded on cassette in the van and fed to other casstte machines at the station.

The decision to use 2 in. was based primarily on two factors, one, the ENG editing equipment was tied up with local news and, two, Behling felt the 2 in. editing would help preserve quality.

Production values were of central importance. To host the show Eddie Doucette, the Milwaukee Bucks announcer, was used. Jon McGlocklin, the Buck's guard, made his broadcasting debut adding commentary. These men conducted interviews with the atheletes and gave the program a certain "star" quality.

Technically the production values were a combination of good camera work from the three engineering department cameramen and very creative editing.

The footage was recorded on Ampex 1200 and 2000 VTRs and edited with Ampex Editec equipment. Most of this work was done on weekends and did involve some engineering overtime.

Slo-Mo, instant replay added a great deal to the show. To achieve it, Behling waited for the annual visit of the Phil Donohue Show that originates from Milwaukee once per season. When the Donohue show rolled into town, with its full remote production unit, Behling put the touch on them for the use of their Ampex HS 100 slo-mo machine and quickly added the special effects to the program.

With the show completed, it was shown to advertisers. "We got a local hardware store that goes into everything in local sports, Schwinn Bike, on a national basis, a sporting goods dealer and a career school. The advertisers," said Behling, "were after a young audience and sports minded people."

Local reaction to the program was very favorable. Behling plans to do something similar next summer though perhaps with other than high schoolers. WITI has acquired a TK-76 and though working with only one camera was challenging, Behling expects to use both cameras next time.

WITI is doing a lot of commercials and, of course, news. But the new equipment is also opening up the local programming area for them. The station actively seeks production opportunities and has done other successful local programs. "We did a half-hour show with a local rock group that is achieving national attention and used the portable camera to provide the type of hand-held shots that lend spontaneity and intimacy that can't be achieved with studio cameras."

All in all, local programming is probably the oldest and yet, untapped resource in the television industry. With new equipment and agressive imagination this situation may not last long.

continued on page 43

The Memorex Video Cassette. It looks like any other on the outside. But it's one of a kind on the inside.

The ins de.

That's where the Memorex Video Cassette with Chromium Dioxide Tape excels.

First we make our own cassette shell to be sure it's a perfect fit for the tape. So the chance of mechanical failure is negligible.

Then we add the traditionally fine performance of the Memorex Chromium D oxide Tape. Tape that offers precise image quality again and again. And once we put it together, you have the video cassette you car rely on. From the inside out.

Memorex Video Tape. Because we make it inside and out.

MEMOREX VIDEO TAPE.

Precision made for precise performance.

Circle 134 on Reader Service Card

The finest multi-core studio and field camera system ever produced by Philips.

Which means the finest multi-core studio and field camera system ever produced.

In the decade since Philips re-invented color with the Plumbicon* tube, its PC-60 and PC-70 have successively stood as *the* reference standard for broadcast performance. Behind Philips leadership, that standard has steadily improved to today's ultimate—the LDK-25.

That Philips has again leapfrogged the competition can surprise no one who knows broadcast cameras...since we created Plumbicon* technology. After a decade of refinement and improvement Philips is still the *only* company that manufactures all of the critical picture determining components—computer-matched yokes, beam splitting prism, deflection circuitry and Plumbicon* tubes. The *only* company that can design each component for optimum performance of the entire camera system. These advantages, of superior Philips design and in-house component availability, offer you unsurpassed stability, picture quality and value.

Further, at Philips, we offer you options that *are* options. The LDK-25 you buy is a custom unit, equipped with the automatic features you select...not a 'loaded' factory package.

But you can't just read about the LDK-25...you've got to experience it.

Only a demonstration can show you how our anti-comet-tail Plumbicon* tubes handle highlights up to 32x normal peak-white level without blooming or streaking—and without loss of our famous color rendition and resolution. 'Live' is the only way to learn what our Color Line-Up Equipment (CLUE) can do for ease of balance... what electronic color temperature control, auto white balance, flexible auto iris and contrast compression mean in use.

Only after you've seen it all—after you've actually handled this remarkable camera—will you understand why the Philips name is a guarantee of incomparable stability ...why no one else can match our 1000-hour performance.

To get your hands on an LDK-25 or to get more information, call us today at (201) 529-5900; (201) 529-3800, or write: Broadcast Products, Philips Audio Video Systems Corp., 91 McKee Drive, Mahwah, N.J. 07430.

See LDK-25 and all the Videostars at Philips' live presentation of INNOVISION '77
NAB-Sheraton Park Hotel

PHILIPS®
*TM-N.V. Philips

Circle 135 on Reader Service Card for literature
Circle 136 on Reader Service Card for a demonstration

TV Programming Briefs

Eighty million Americans, according to the National Nielson Ratings, saw the final episode of "Roots," the ABC programming phenomenon . . . . The KPIX, San Francisco, program, **"Evening,"** which is completely **done with ENG equipment,** will be broadcast on all five Group-W stations beginning this fall . . . . Florida bankers were told at a seminar last month that they were missing out on a **$30 million investment which could double in a few years** if they would invest in the film and videotape production industry in that region.

The FCC investigation into network relations with affiliates could lead to **greater diversity in program creation.** At least, that is the hope of FCC commissioner Joseph Fogarty who sees the investigation as a part of an effort to create "a competitive television program market place in which creative achievement and artistic excellence can prevail."

Bob Wormington of KBMA-TV urged the members of INTV, in a speech at their San Francisco meeting, not to delay in the **construction of earth stations in at least the top 25 markets.** Wormington and others see the establishment of a network of earth stations as a major step towards the ability of local stations, affiliates and independents, to utilize each other as important sources of programming. The Independent Television News Association is just the first step, according to some, in a process that will lead to more "strip" programming made up of contributions from several local stations.

Ed Libov, an ad agency president, said at a half-day seminar for broadcasters, that if they would **eliminate certain "station stonewalls,"** they could attract much more of the retail advertising dollar. The problem areas, according to Libov, include: the lack of firm timings at the beginning of a campaign; difficulty in making last minute changes when a store runs out of an item; inconsistent policies between stations in continuity clearance; and make-goods that really don't make good for a mis-run commercial.

A campaign coordinated by the Interfaith Center on Corporate Responsibility of New York represents more than 150 churches banded together **to fight violence in television programming** with the use of their stock portfolios. The core of the church plans is to introduce a resolution at corporate investors meetings which states, "This company shall not allow its advertisements to appear in television programs containing excessive or gratuitous violence.

Kevin O'Connell, WQXI, Atlanta says:

"Starts instantaneously! The 850. And it's super-rugged, with a half inch thick hardened aluminum deck. Warp proof! You just can't damage an 850."

"The keyboard configuration allows eyes-off, hands-on "Touch System" control. And the RECORD key's double spaced so I won't hit it by mistake."

"Fastest editing machine I've ever used! I can use a grease pencil. The split gate opens for perfect visibility without lifting the tape."

"Differential braking stops reels smoothly, without slack or risk of tape damage. And the reels are held gently so I can move reels manually to locate a final point."

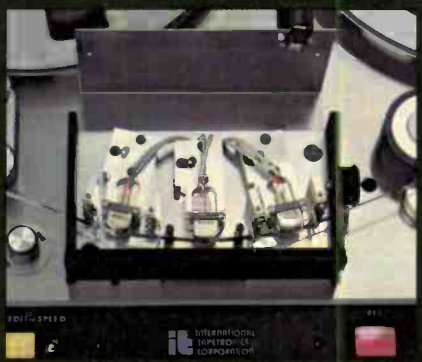
"I.T.C. designed it for me!"

"When I mix reels I just flip a switch to compensate for the different hub sizes. And because the calibrated level control 'clicks' when I move it out and back into position I can always return to my calibrated setting. Easily."

"When I touch FAST, the gate opens automatically and lifts the tape from the head. Or, I can open the gate manually. Manual positioning, or 'gating', lets me monitor the tape in high speed modes without risking damage to meter, amplifiers or speakers."

"Dumping tape in the edit mode is fast, easy, foolproof. Moving the tension arm down turns the take-up reel off. I can discard tape, listening as I go."

"There's also a fool-proof push button tape marker. Or, I can crease-mark the tape against a disc positioned for this purpose."



"The hinged lid lifts back for access to the entire head assembly."

"This new high-friction polyeurethane roller pulls the tape with less pressure. Less wow and flutter."

"The Playback/Record Synchronizer lets me record on one channel and listen to another, in complete synchronization."

"The 4-position Meter Mode switch allows visual comparison of recording input and playback output so I can create virtually distortion-free recordings."

CALL TOLL-FREE:
800-447-0414

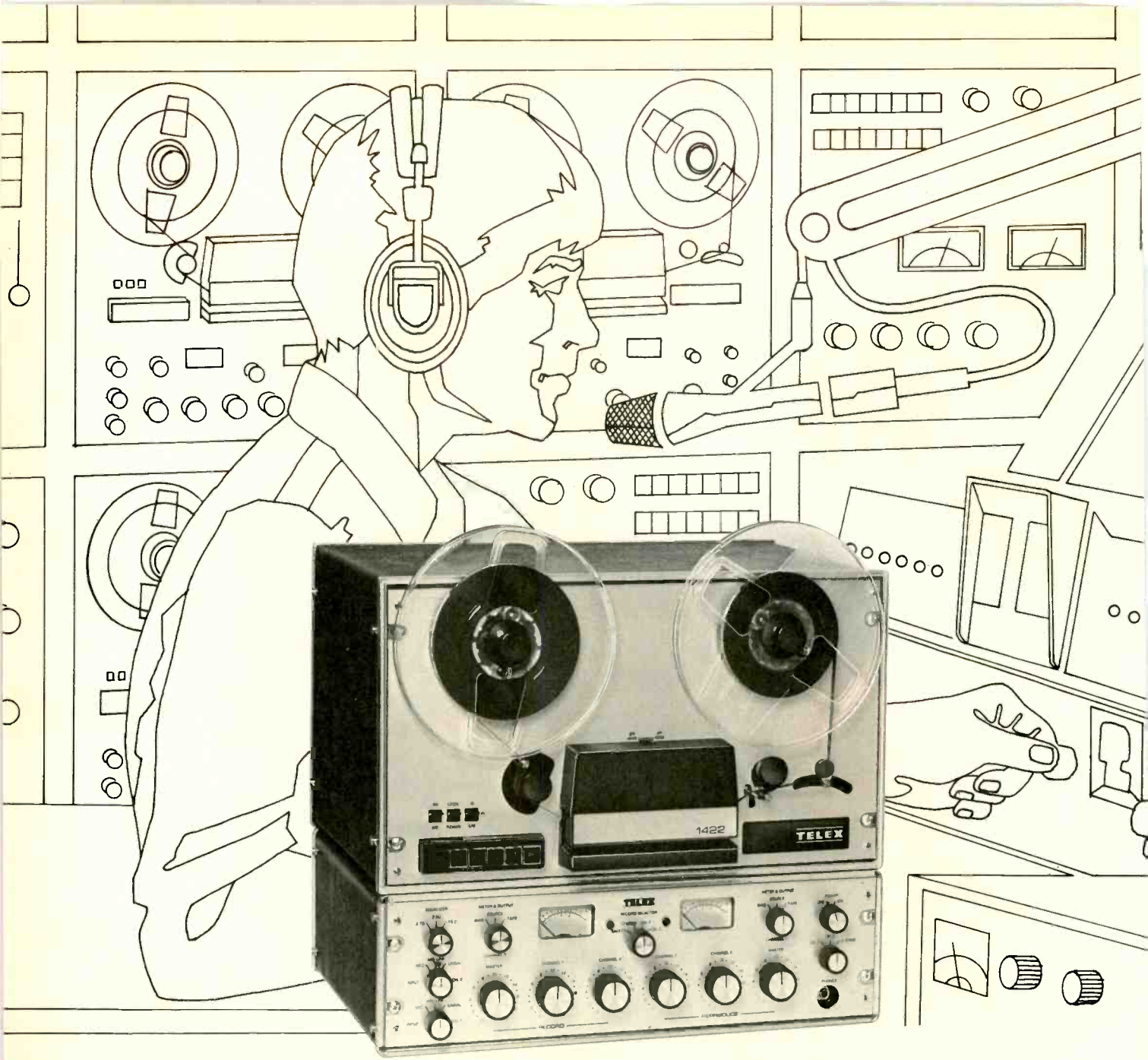
In Alaska, Hawaii or Illinois call collect: (309) 828-1381

Ask about our attractive lease-purchase and trade-in plans.

Circle 138 on Reader Service Card

INTERNATIONAL TAPETRONICS CORPORATION
2425 South Main Street, Bloomington, Illinois 61701

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



Old-New Reel Time Recorder

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

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

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

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

PRODUCTS OF SOUND RESEARCH

TELEX®

COMMUNICATIONS, INC.

9600 ALDRICH AVE. SO. • MINNEAPOLIS, MINN. 55420 U.S.A.
Europe: 22, rue de la Legion-d'Honneur, 93200 St. Denis, France
Canada: Telak Electronics, Ltd., Scarborough, Ontario

Circle 139 on Reader Service Card

One Newscaster Plus One Computer: Flexible, Error-Free Operation For Mutual

The news-and-sports network, with 750 subscribers, has computerized its operation for an ultra-smooth, regionalized service that would be impossible with all-manual operation. It is "total automation" for Mutual, straight through from the traffic and sales department to the delivery of programs to subscribers. But the live newscaster or sportscaster is still the basic "product"; here is how the system keeps him on top.

HOW DOES A NATIONAL NETWORK OPERATION shift news and commercial feeds among up to six different groups of its 750 subscriber stations, often several times in the course of a five-minute newscast, with just the newscaster and a single button in control?

The answer, of course, is the computerizing of control, which is what the Mutual Broadcasting System has done at its super-efficient new headquarters and production complex in Arlington, Virginia, just across the river from Washington.

But computerized switching is only half the story. Mutual has developed its own special variety of "total automation," with computer control all the way through from the traffic and sales department until the various feeds leave the building, via telco line, to subscriber stations across the country.

Two computers are involved. One, the data processing computer, an IBM System 3, has been in use for some time to handle all accounting, reports, traffic data, and the development of a daily program log showing what happens when. The second computer, just going on line as this is written, is a Data General Nova, and it is being installed and "interfaced" by McCurdy Radio Corp of Toronto. It carries out the switching according to the log developed by the data-processing computer.

The log comes out of the data-processing computer in the form of a floppy-disc magnetic recording which is simply moved over to the switching computer once every 24 hours. There is also a print-out of the advance log for record-keeping, error-seeking, etc. And the switching computer also supplies a log print-out showing what it actually put on the "air" and when, for billing confirmation.

The central feature of the operation, though, is the relation of the newscaster to the computerized schedule. The real-time newscast, with live transmission of the newscaster or sportscaster, is the essence of the Mutual operation. The log fed into the switching computer via the floppy-disc memory is called by Mutual the "skeleton log," since it includes only the sequence of commercial assignments and those for any other recorded material—intro theme, stinger, etc.—which are slated for each one-hour segment of the program. But the exact timing of the commercials depends on the newscaster himself.

He sits at a mic position, and the operator has a simple control panel with single "Take" button for normal operation (others for other cases). He also has in front of him a CRT screen showing a read-out of the upcoming newscast as the computer has it in the memory. The read-out shows him what is on the air at every moment, what has been aired, what is coming up.

There are a number of variations in the sequence, but a five-minute newscast will often have something like the following format:

0:00—Computer sends cue tone turning on mic position; start theme rolled by computer, faded by computer.

0:05—Computer gives mic to newscaster—CRT and on-air light tell him he has it. He speaks an intro and system and personal ID—"This is comprehensive news from Mutual—I am John Doe"—etc. At end of intro, operator pushes the control button and computer again has control. Stinger.

The Significance of Automated Production Systems

"With the advent of television in the early 1950's, many thought radio networks would lose their importance and value in serving the American public, and eventually fade into the ionosphere. But instead they grew and prospered. Today Mutual is larger and stronger than at any time in its 43-year history, with more products, affiliates and higher audience ratings . . . With its advanced engineering technology and the implementation of new techniques in the uses of computers and satellites, Mutual looks forward . . . to even greater growth in the years ahead."
—C. Edward Little, president, Mutual Broadcasting System

One Newscaster One Computer

0:35—Sixty seconds of commercials rolled by computer (one 60-second spot or two 30s).

1:35—Computer gives mic to newscaster. He speaks main body of newscast. He can run a little short or a little over—system is not on clock at this time—computer waits for him.

3:50—Newscaster gives an ID again—"This is Mutual" etc. Then operator pushes the control button, giving system to computer.

3:52—Computer rolls another 60 seconds of commercials.

4:52—Computer gives mic to newscaster. "This has been John Doe with Mutual News" etc. He can shorten or lengthen this slightly according to time left.

5:00—Computer shuts down that mic position.

So far, it is pretty straightforward, and it shows how computer control can be readily adapted to the particular needs of the operation. Many variations are easily introduced. For example, recorded actualities are frequently added to the newscast. One or more actualities can be entered in the computer's memory sequence up to a few seconds before the broadcast, and will immediately appear on the CRT screen in the proper order. The newscaster can introduce each actuality, then roll it by simply pushing the control button when he comes to that part of the sequence.

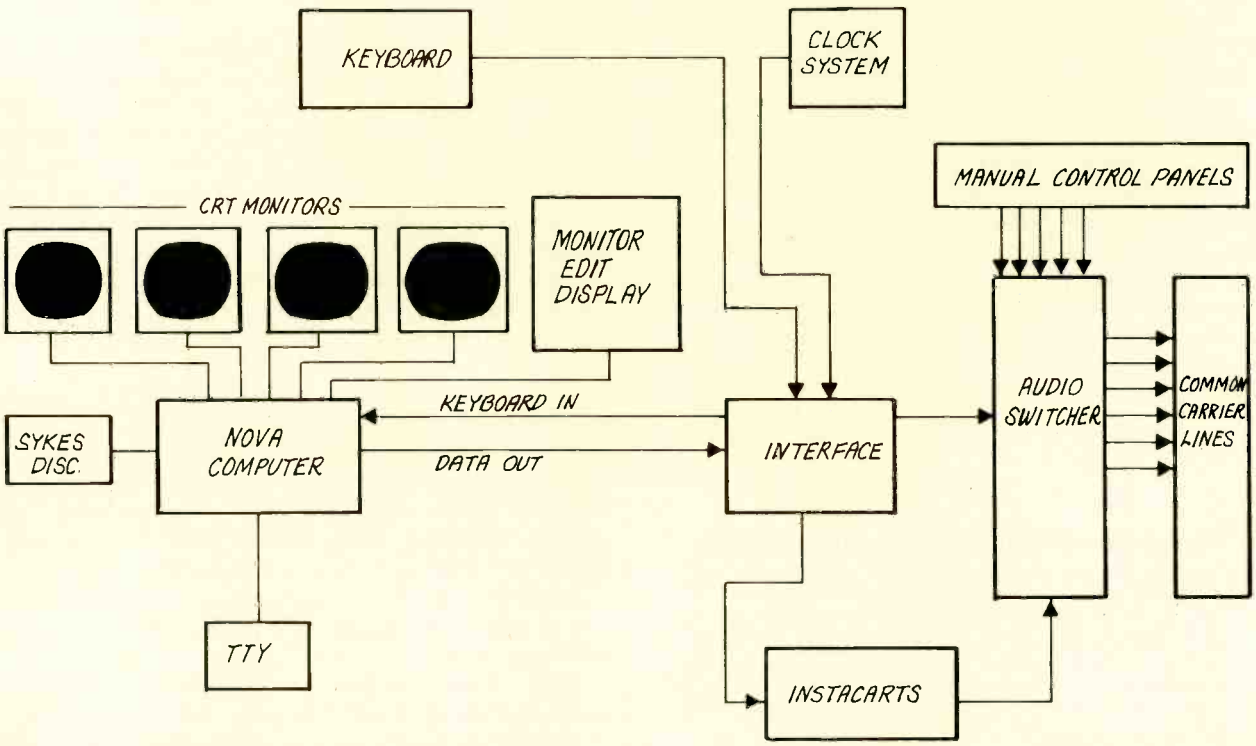
This scheme clearly provides a particularly smooth, and at the same time, "live" quality, with the newscaster giving what is in reality fast-breaking news, with all its impact preserved. It might be carried out by manual control with the newscaster and a couple of control operators, but they would have to be very much on their toes. (In fact, the system is set up so that if the computer ever goes down, it *can* be done on an emergency basis by manual control).

However, the handling of the commercials introduces complexity that would make error-free manual operation over any sustained period, with true split-second switching, an impossibility. Gary Worth, executive vice president, told *BM/E* that Mutual decided some time ago computer operation was a necessity for them. This decision was motivated by Mutual's growth from 500 subscribers in 1972 to the present 750, and by the increasing complexity required in handling both the news and the advertising.

National advertisers are increasingly asking for regionalization of commercials. Mutual already has the country divided into six territories, and can reach any one or any combination separately. The region or regions to which a commercial must be sent are entered in the log with respect to that commercial. That information comes over to the switching computer on the floppy-disc memory.

When that commercial is reached in the switching sequence, the computer routes it where it is contracted to go. As Gary Worth points out, there can be as many as 24 different commercials in one five-minute newscast, each with different routing that must be switched in before the commercials roll. Operators with push-buttons, even with the pre-switch set up used for years in broadcasting, would be too subject to error, working minute to minute from some sort of cue sheet. The computer does it in milliseconds and makes no mistakes.

All recorded program material—commercials, actualities, ID theme, etc.—is entered into the system on



Simplified block diagram showing some main units in system built by McCurdy Radio Corp. for Mutual's automated switching. Skeleton program comes daily on floppy disc produced by automated processing computer, enters system through Sykes unit. Keyboard allows entry at any time of additional events, changes in timing, or total disconnection of computer. Audio switcher, built by McCurdy, is a five-bus system designed specifically for the application. "Nova" computer will roll recorded material on Insta carts, or open one of mike positions (not shown here) on schedule.

Gary Worth, executive vice president of Mutual, shows C. Edward Little, president, how recorded material on Instacarts is entered in new system, by insertion in specified trays in master control room. Tray position is part of "event coding" in disc memory for each program event; when that event is reached in a program sequence, or at clock time, computer rolls the specified cart.

Master control for new Mutual system includes switching for routing incoming material to one of taping rooms or "on air," plus switching for outgoing feeds, ordinarily assigned by the computer. Console also has keyboard for entry of additional program events in computer memory; will have CRT read-out of program block (not installed at time of picture).

One of five editing-taping rooms, which receive material on any of incoming lines, make open-reel recording, which can then be edited into final form for "broadcast." Recordings are often made of entire meetings or hearings, with significant statements or interviews later edited into "actualities." Final material is transferred to Instacart for entry in system and distribution to Mutual subscribers across the country.

IGM Instacarts. The IGM system was modified by Mutual to meet the system requirements exactly. There is a series of Instacart trays in the master control room, each tray position with an identifying number marked alongside and entered in the switching. The computer "knows" all the numbers, rolls the cart at the tray position called for by number in the log sequence.

Operators put the carts in the trays according to cue sheets. They have time to do this because several "blocks" can be entered ahead of time: there are enough extra tray positions. If necessary, three or four blocks of material can be put in the trays during the progress of one five-minute newscast.

That is a very brief summary of how Mutual gets the news out; working back, here is a similarly short account of how it gets the news in. Mutual's two specialties are, of course, up-to-the-minute news from everywhere, and whistle-to-whistle live coverage of major sports events.

The National Capital naturally generates a good part of the news. Mutual has dedicated telco lines into the White House, the Capitol, various legislative meeting rooms. At the studios, incoming material can be put directly on the air or routed into one of the five tape-editing rooms.

Thus Mutual can air or tape an interview, statement, or eye-witness account from any of the Capital focus points. They can record a whole meeting or Congressional hearing, and edit significant moments or statements into actualities for broadcast.

Telco lines bring in the reports from Mutual newscasters in other cities and from their sportscasters at the big sports events. These, too, can be put on the air immediately or taped or both.

The wire services also bring in news reports from around the world. All incoming material—taping from Mutual's own reporters, actualities, wire service reports—is available in a large editing room. Here Mutual's headquarters newscasters write their material for the standard on-the-hour newscasts. Mutual has developed a policy of having each newscaster write his own broadcasts: this gains immediacy and force for both the written copy and the spoken delivery.

Those are the main elements of the operation. A few additional capabilities suggest the open-ended benefits and flexibility of automation. For example, Mutual has an arrangement with a number of subscribers for automatic rolling of recording equipment at the subscribers location, on the sending of a cue tone from Mutual. This, too, reduces the chance of operator error (this time at the subscriber station).

Although Mutual has in the past usually had one outgoing program, the system has the capability for handling up to 25 program feeds, and this means that diversification of programming can be accomplished with all the ease and sureness that characterizes the current operation.

Also aiding in diversification, as well as improving the service in other respects, is the increasing use by Mutual of satellite feeds to subscribers (see separate story on satellite developments).

The system design for Mutual's headquarters automation was made by Ray Harrison of Harrison Systems, broadcast engineering consultants of Riverdale, MD, in collaboration with the Mutual engineering division. Ray Harrison is also currently doubling as Mutual's vice president, technical operations. **BM/E**

Introducing the Family of

Now you can add that perfect touch of editing professionalism to any news story or commercial on helical videocassettes with Convergence Corporation's Family of Fabulous Frame Finders. Discover how fast and easy it is to find any frame you're looking for and how simple it is to automatically do what you want once you're there.

SM-2 Joystick Search Module gives you incredibly flexible tape handling and remote control on a stand-alone VCR. The unique Convergence joystick allows you to see pictures at speeds continuously variable from still frame to three times normal play in forward and reverse. The LED tape timer lets you quickly screen and log news stories or commercials for pre-edit decision making. The SM-2 also programs precise on-air roll cues and lets you slave extra playback machines for A/B rolls.

ECS-1 Joystick Editor provides, for the first time, film-style editing flexibility on helical videocassettes. News film editors converting to video tape find the ECS-1 a snap to operate. In fact, networks and group owners are already using the ECS-1 by the hundreds. Production houses have found our Editor to be perfect for economical on-line and off-line editing. The Convergence Editor is great by itself, but it's fantastic when combined with the PC-3 and the TT-4 — the newest members of our Fabulous Family.

SEE US AT NAB—SHOREHAM HOTEL, BOOTH 509

Fabulous Frame Finders.

TT-4 Digital LED Tape Timer fits neatly under the monitor on a standard ECS-1. It counts control track pulses to let you know where you're at and where you're going. It's just what helical video tape editors have been looking for. The TT-4 counts up and down and can be reset to zero or preset to any number. It even times assemble edits to give you accumulated program time. Buy it now or add it later.

PC-3 Program Computer combined with the ECS-1 gives you precise end insert timing and scene duration timing. Insert and stopwatch functions are programmable with the simple-to-operate PC-3 computer keyboard. Now you can automatically preview insert edits as many times as you want and trim them up to ±99 frames from the keyboard. What's more, plug your PC-3 into a TT-4 and get keyboard access to automatic bidirectional tape search.

Take the time and trouble out of your VCR searching and editing. Join the Family of Fabulous Frame Finders today. They'll help you find exactly what you're looking for. For complete specifications and address of your nearest distributor, write Department BME-3

CONVERGENCE CORPORATION

17935 Sky Park Circle / Irvine, CA 92714 / (714) 549-3146 / Telex: 910-595-2573

Circle 140 on Reader Service Card

An Integrated Radio Newsfeed Turns A Whole City Into A Newsroom On The Air

The CBS Radio Network has just put into operation, in Washington, an ENG system that allows reporters to reach the studios with hand-held transceivers from anywhere in the city: any reporter can be on the air as he talks or he can be taped at the studios for later broadcast. The system includes instant, highly flexible management of remote operations, with two-way communication between studio and reporter or interviewee. Any moderately large radio station could use some or all of these ideas.

RADIO'S ENG IS NEARLY AS OLD as radio itself, and until recently, radio managements did not generally feel any strong need for instant air-play of news remotes from everywhere in their respective areas. But, as *BM/E* noted in the January issue, the example of the ENG explosion in television is changing that. A new kind of radio ENG is in the making, one that *does* put a whole city on the air in real time.

Several examples were described in the January article. The CBS Radio Network gave the movement to "real-time" radio ENG another big boost with a system put on the air in Washington in February; it has a number of operating features beyond any of those described in the January article. It feeds national-capital news to the CBS network studios for country-wide distribution. It demonstrates how up-to-date radio technology plus sophisticated system planning can supply "total immediacy" in city-wide news coverage.

Here are the main operating modes of the CBS Washington system, showing its high efficiency as a news-gathering "machine":

- The news studios can get as-it-happens signals from reporters with hand-held transceivers who are anywhere in the coverage area;
- The reporter feeding a story in from the field can do a Q&A (question and answer) with the anchorman back at the studio, using the same hand-held portable;
- Other reporters in the field can hear both sides of this conversation on a cue channel on *their* portables, and thus are kept "smart" while waiting to go on the air;
- The news editor/producer can override whatever is on the cue channel and send out late-breaking information or new orders, without interfering with an incoming feed;
- The editor/producer can have a private two-way conversation with any reporter not making a feed, or can talk two-way to all reporters simultaneously;
- Two reporters or other station personnel assigned to the same area can use their portables to communicate with each other, without interfering with a news feed;
- The system may be switched so that the cue channel is used for a feed if there is interference or other trouble on the main channel;
- The repeater stations have emergency power on tap;
- The system can be used as a one-way paging system to reach key news personnel (not reporters with transceivers), who carry pocket-sized receivers;
- The reporters' portable transceivers are extremely simple to use, with only a "press to talk—release to listen" button for normal operation.

How is all this done? The basics of the system are: the hand-carried transceivers or "bricks," with 4 watts RF output; four remote receiver stations placed around the city in strategic locations so that one or more of them can be reached with one of the portable transceivers from almost anywhere. The "satellite" receiver stations are connected back to the studios by equalized telephone lines. This removes the limitations of range and reliability which have curtailed the use of hand-held transceivers for city-wide news feeds.

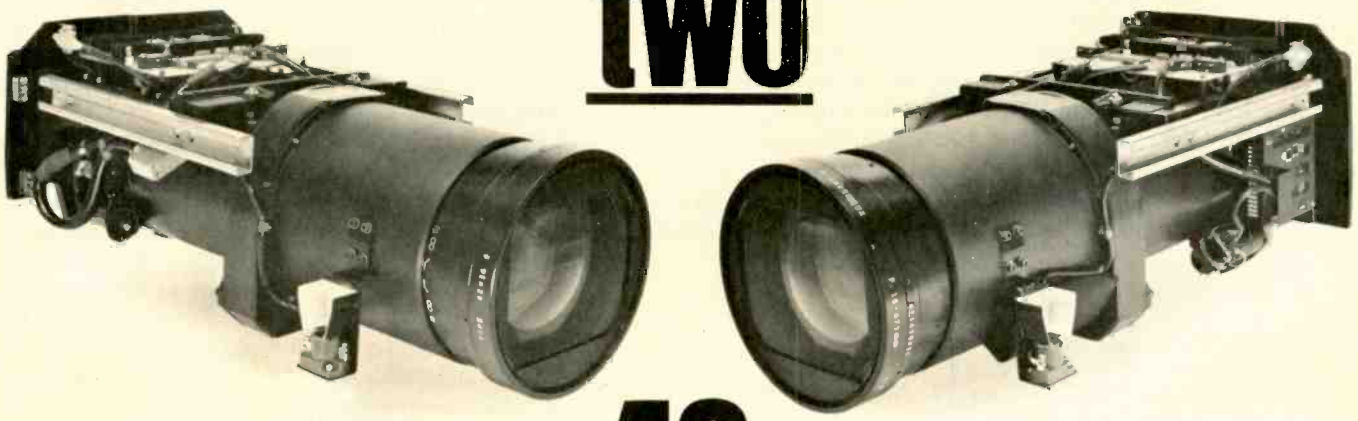
At the studios, there is an automatic diversity system which chooses the best signal from those picked up by the satellite receivers. However, there is a manual override so that the studio operator can choose the incoming signal if the one chosen by the system is degraded by interference or has any other problem.

The whole system, base station, satellite receivers, and portable transceivers, operates on two frequencies, 450 MHz and 455 MHz. When a reporter pushes his "talk" button to send in a report, his portable will automatically be on 455 MHz—this is the normal "feed-in" frequency. The satellite receivers, too, are normally on 455 MHz.

The base station has a 100-watt transmitter on 450 MHz, which is the normal "cue" frequency. The portable transceivers, which were developed by General Electric in collaboration with the CBS radio network engineering department, have a mode which GE calls "True Channel Guard Search Lock," which operates in

continued on page 54

now there are two



42x continuous zooms

for Studio and Field applications

WIDE ANGLE • CLOSE FOCUSING • LONG FOCAL LENGTHS • HIGH APERTURE

wide horizontal angle: 56°
minimum object distance: 25″
high speed: f/1.5 for 1″ tube
f/2.0 for 1¼″ tube

high speed: f/5.7 for 1″ tube
f/7.6 for 1¼″ tube
at a tight narrow angle: 0.7° (HORIZONTAL)
for large magnification

The angēnieux 42x zooms provide production capabilities unavailable with any other zoom lenses. Their unique flexibility allows uncomparable shots for all types of production—variety, sports, drama and commercials. They can save you time and money because the 42x's can do so much.

See us at the NAB
Booth 403
Washington Hilton

angēnieux corporation of america

1500 OCEAN AVE., BOHEMIA, N.Y. 11716 (516) 567-1800

13381 BEACH AVE., VENICE, CALIF. 90291 (213) 821-5080 • 4, HAVEN HILL SQUARE, AGINCOURT, ONTARIO M1V 1M4 (416) 291-2363

Circle 141 on Reader Service Card

each portable when it is in the "listen" mode. This provides automatic rapid search between 455 MHz and 450 MHz for the correct carrier and cue tone. When a signal goes out from the base station cue transmitter on 450 MHz, along with the sub-audible cue tone, all portables in the field not actually in the "talk" mode are automatically switched to receive on 450 MHz.

A large part of the time they will be sent a retransmission of the current "feed" from the reporter who is on 455 MHz. This may be a two-way interchange between that reporter and the studio, because the studio can instantly reach the reporter on 450 MHz whenever he releases his "talk" button, and this is also fed to all listening reporters. As noted in the list of modes above, having the listening reporters get both sides of the interchange keeps them "smart" while they are waiting to make their own reports.

But the anchorman or news director can alter this regular listen mode, as noted in the list, by overriding directly on the cue channel to issue a new order to the reporters, or inform them of late-breaking news. This makes *management* of the remote news operation fast and efficient. One or more reporters can be sent immediately to catch a news break, knowing what it is they are after and what its significance is.

But suppose the editor/news producer wants to talk to just one reporter. The "search-lock" system has a set of selective cue tones which lets the studio put any one of up to eight of the remote portables separately in the listen mode. With one of the selective tones, only the called transceiver is automatically switched to listen on 450 MHz. The reporter answers by simply pushing his "talk" button, which puts him on 455 MHz for transmission to the studio over the regular route thus providing editor-to-reporter privacy.

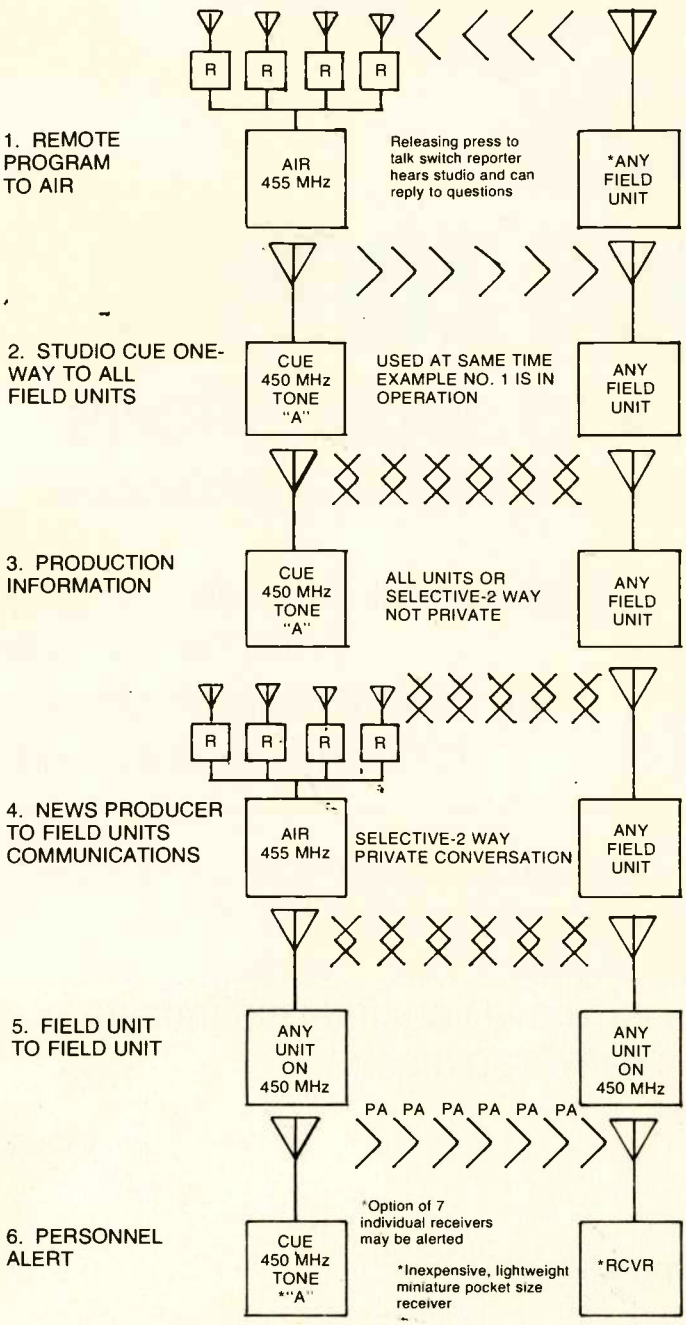
So far, we have noted that all transmissions from the hand-held transceivers are on 455 MHz. However, the reporter can switch his transceiver to transmit on 450 MHz. This has two main functions: he can talk to any other reporter in his area, two-way, without interfering with a newsfeed on 455 MHz; the 450 MHz can be used for a newsfeed back to the studios in any emergency which temporarily makes 455 MHz unusable. In the latter case, the satellite receivers are switched *from the studios* to 450 MHz, but can be switched back to 455 MHz whenever the studio wants. In this emergency mode the studio does not have instant cueing of the operation, but this mode can feed a vital news story while adjustments are made to restore 455 MHz to service.

The final mode is "paging." The 450 MHz cue transmitter, with selective cue tones (up to seven) can be used to reach personnel who have miniature pocket receivers. These cue tones do not activate the portable transceivers. In this mode the system is used to reach key news personnel in the field who are not reporters primed to make actual feeds.

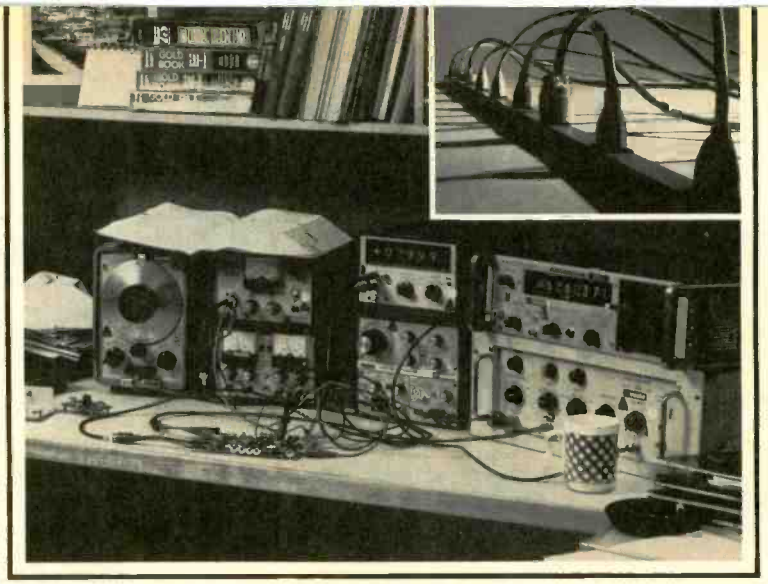
The whole system, including the base station and all satellite receivers, has emergency stand-by power to keep it going if commercial power fails.

To supplement the hand-held transceivers if wider area coverage is ever needed, the system includes larger portables (nine pounds, 18 watts RF output) called "Porta-Mobiles" by GE which can run on AC power, on a battery, or can be plugged into an automobile cigarette lighter. They can use external antennas and have inputs for tape machines and other audio sources. They can be set up easily and quickly without using tools, in a rented car or at a remote site. Their higher power and use of external antennas give them greater range than that of the hand-held units.

In this newsfeed system, the CBS radio engineering department has provided an outstanding example of how getting a complete *concept* of a viable system is the prerequisite to important technical progress. The concepts of the system originated in an engineering system specification prepared by Lawrence Solow, CBS radio project engineer. The project was conceived and carried out under the direction of Ralph Green, the CBS radio network director of engineering. **BM/E**



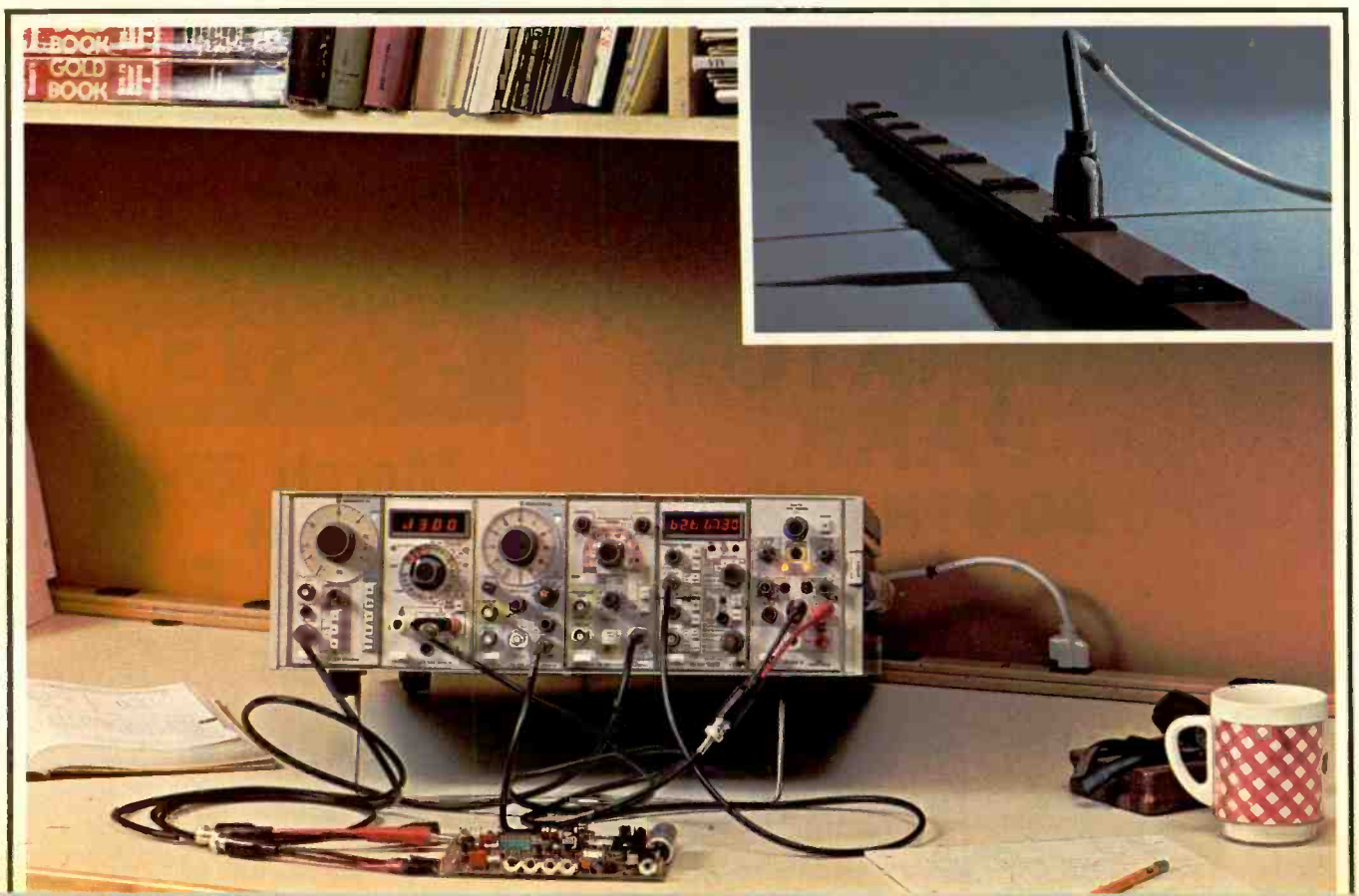
Six modes of operation are possible.

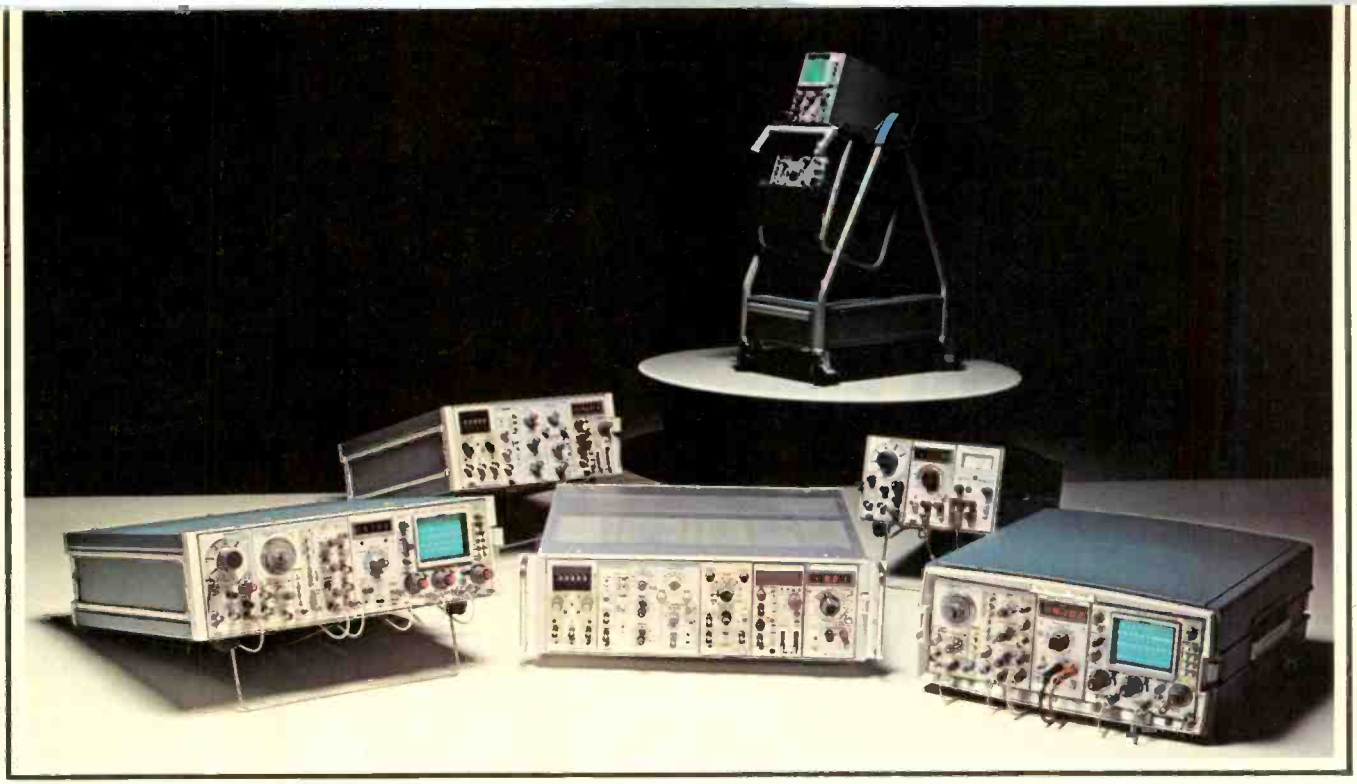


Here's an idea that could change your thinking about test equipment.

A complete test station doesn't have to be an assortment of special-function instruments. A working workbench doesn't have to be crowded and unhandy. And a truly portable test lab doesn't have to be out of reach.

TM 500 offers you an alternative: a modular line of compact, interchangeable plug-ins and mainframes. Multiconfigurable both in packaging and in performance, TEKTRONIX TM 500 is designed around the idea that test equipment which is compatible in every respect can, in fact, cover a broader range of functions and meet a wider variety of measurement situations. To say nothing of its ability to adapt more readily to new challenges.





Modular DMMs, counters, generators, amplifiers, power supplies, oscilloscopes, logic analyzers, and word recognizers can be interfaced electrically. Signals

can be routed from one plug-in board to another via the mainframe mother board, thus enabling you to build a test instrument that's more powerful than the sum of its parts.

The plug-ins can be configured together in six widths of mainframe and four types of packages, depending on where and how you'll use them. Select the plug-in modules you need just as you would monolithic instruments, and then combine them in the appropriate mainframe for a convenient, uncluttered bench setup; mount up to 6 functions

side-by-side in a 5¼-inch rack; build a rollabout station that "follows" you around the lab. Or

pack a portable test station in the small-as-a-suitcase TM 515 Traveler Mainframe, which carries up to 5 modules and typically weighs less than 35 pounds, including the modules.

The result is a total test system that looks like a unit . . . works as a unit . . . yet is still configurable to new or changing measurement requirements. So the next time you're looking into test instrumentation, specify the one product line that's designed for configurability.

For further information or a demonstration of TM 500 Instrumentation, write or phone: Tektronix, Inc., P.O. Box 500, Beaverton, Oregon 97077, (503) 644-0161 ext. 5283. In Europe: Tektronix Limited, P.O. Box 36, St. Peter Port, Guernsey, Channel Islands.

Tektronix®
COMMITTED TO EXCELLENCE

TM 500...designed for configurability.

Circularly Polarized Antennas To Be Approved For TV: You May Be In A Position To Benefit

The FCC will permit television broadcasters to use CP antennas but the decision to adopt CP will have to be made in the marketplace

CP antenna from Harris of the type that will be used by KBYU-TV, Provo, Utah.

THE STRUGGLE FOR PERMISSION to use Circularly Polarized antennas for television transmission has gone on for nearly two years. The word from the FCC is that the Policy & Rules Division has drafted a favorable recommendation to the full Commission, and is likely to reach a decision based on those recommendations before the NAB Convention adjourns this month in Washington. Confirmation of this position was provided by John Taft of the FCC Policy and Rules section at a speech before the Winter Conference of the SMPTE in San Francisco, last month.

The Commission will issue a "permissive" ruling such as was asked for in the Petitions for Rule Making filed by Jampro Antennas Company and the American Broadcasting Company. The notion of a "permissive" ruling is that the Commission is permitting the use of CP antennas because none of the reasons for denying the use of CP fall within the jurisdiction of the FCC's mandate. The fact that CP will be expensive to adopt is not a basis for the commission to deny the petition . . . . but could form the basis for acceptance or rejection of CP antennas in the marketplace.

Admittedly, the cost of CP will be considerable. Because of the requirement to propagate a signal in both the horizontal and vertical planes, either the gain of the antennas has to be doubled, or the power of the transmitter must be doubled to maintain the station's ERP. Because of the increased windloading problem of CP antennas, the doubling of antenna height for some stations would be completely impractical, for others, such as UHF broadcasters, the doubling of transmitter power will be all but impossible considering the higher operating costs for increased electrical power, and in some cases, simply the unavailability of efficient transmitters in more powerful UHF frequencies.

The manufacturers' position is that these are problems that remain to be solved through research and development and that they do not constitute sufficient cause for a regulatory ban on a technology that can provide improved television signals for some broadcasters in the short run, and with development, to most broadcasters in the future.

How much improvement can be expected now and in the future is a matter of some disagreement. The most extensive tests yet conducted by the industry on the effect of CP were conducted by Jampro Antenna Company using an antenna of its own design for UHF Channel 19, KLOC-TV, Modesto, California, and by ABC on its own WLS-TV, Channel 7, Chicago by broadcasting consultant, Neil Smith, of Smith and Powstenko, Washington, D.C.

It should be noted that the full potential of CP would probably not be derived without the use of CP receiving antennas but some benefits are still derived when HP (horizontally polarized) receiving antennas are used. Jampro and ABC maintain that the greatest benefit is to viewers using indoor antennas (rabbit ears, bow ties, etc). with less benefit to viewers using outdoor antennas (rooftop types). The notion that CP antenna transmission will "require" the viewer to buy a CP antennas does not seem to be justified in view of the fact that CP transmission has been used in FM since 1946 (currently almost 95% of FM stations use CP) and there is still no CP FM receiving antenna on the market due to insufficient demand. CP receiving antennas would almost necessarily be larger and more expensive. But, there is increased use of indoor antennas, and in some locals, outdoor antennas are banned by local statutes because of their "unsightliness."

continued on page 60

Still *manually* monitoring VITs?

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

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

So if you are still manually monitoring VITS . . . we have the immediate solution . . . contact **mi** today!

SEE US AT BOOTH NO. 106 NAB

MARCONI INSTRUMENTS
DIVISION OF MARCONI ELECTRONICS INC.

100 Stonehurst Court, Northvale, New Jersey 07647 • (201) 767-7520 • TWX: 710-991-9752

Circle 144 on Reader Service Card

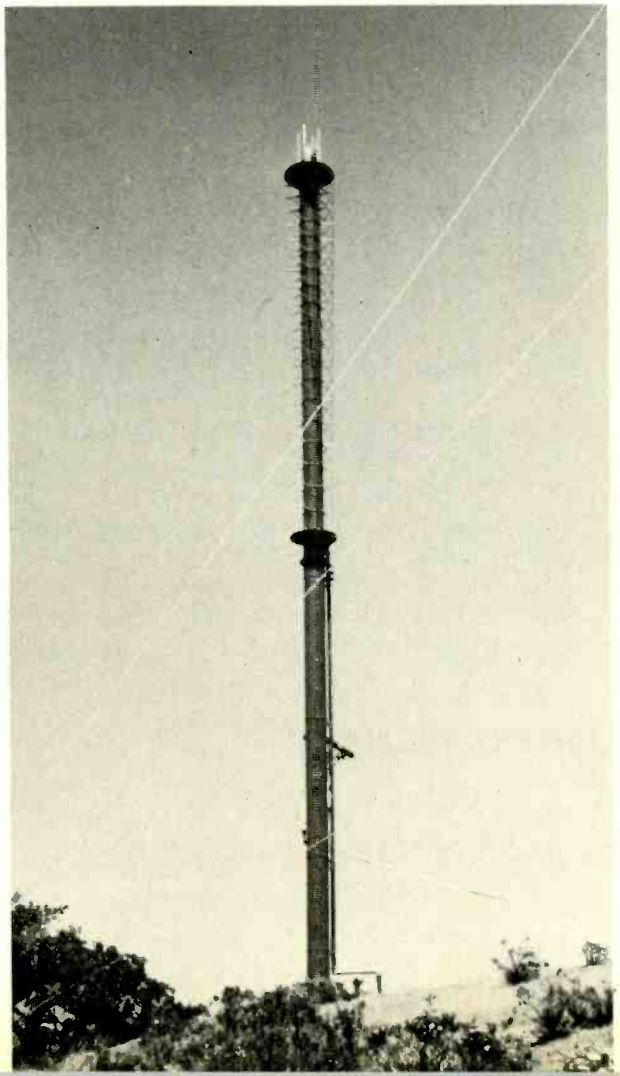
Circularly Polarized Antennas

As things stand now, the circumstances that would derive the greatest benefit from CP would be a lowband VHF broadcaster transmitting to a viewer using an indoor antenna. The next greatest benefit could be expected by highband VHF broadcasters and then, the UHF broadcaster. Viewers utilizing rooftop antennas could expect little or no benefit.

The benefits that could be expected include: such indoor antennas need not be precisely oriented toward the transmitting antenna; several "magnitudes" of ghost reduction when the broadcaster switches to CP, while the viewer does nothing; the increased energy picked up by the indoor antenna should provide a clearer picture; and defective or improperly maintained home receiving antennas suffering from broken leads, corrosion, bent or damaged elements, or generally poor mechanical or electrical condition could also expect some improvement.

The question that remains, however, is how much improvement is "some improvement?" Now this is the area that gets rather treacherous. We can expect that considerable improvement can be received in circumstances where the viewer is now the victim of severe ghosting, uses an indoor antenna, and is lackadaisical about adjusting his antenna for optimum reception. Virtually no improvement can be expected by the viewer with already excellent reception using a properly maintained outdoor antenna. Viewers in the middle circumstances may or may not get some marginal improvement.

Jampro circularly polarized UHF test antenna, KLOC-TV, Modesto, CA.



In Reply Comments filed by Neil Smith, the consulting engineer for ABC, an important point made is that even if 80 percent of the data indicates a small change (improvement) "this does not diminish the fact that the remaining 20 percent of the data shows a *noticeable* change." When translated into absolute numbers, the percentage changes could mean a large number of viewers. A positive change is just that and the fact remains that the data shows very few instances of negative change.

Opposition to the CP change was marshalled by the Corporation for Public Broadcasting (CPB), the Association of Maximum Service Telecasters (AMST), and CBS. The points raised by CPB, AMST, and to a lesser degree, by CBS, seemed to stress that the cost of CP adoption would put an undue financial burden on UHF broadcasters, both in initial cost factors, and operating cost without a corresponding real improvement in their service. CPB felt that for the Commission to approve CP would not be consistent with its intention to create parity between VHF and UHF services. CPB believes that CP would be foisted upon UHF services in order to compete effectively with VHF services which adopt CP; then claim technical superiority, and that CP has greater potential benefit for VHF. The supporters of CP point out that broadcasters are unlikely to rush hellbent to CP but rather will watch to see, on a market by market basis, how CP does. If its performance is superior and the conditions under which its performance is superior can be identified, then other broadcasters are liable to adopt it if they fit the same set of circumstances. In effect, what CBS called for in its comments on the petition was a "slow down," to permit further study of CP. The ABC and Jampro position suggest that such further study can only be made if CP is authorized so that it can be applied on a wide enough scale to make the kind of studies that CBS thinks necessary.

The data from the tests clearly show that: ". . . . the use of circular polarization with the same ERP value does not increase the station's service area . . . . (and) . . . . Co-channel interference, as well as adjacent channel interference, does not increase or decrease, but rather remains the same when reference is made to the horizontal linear component which is the standard adopted by the FCC." Furthermore, if CP receiving antennas were used in conjunction with CP transmitting antennas, "there would be a decrease" in both co-channel and adjacent channel interference. In the CPB comments, it is pointed out that because of the vertical component in CP signals interference from CB radios might be more severe. That, of course, remains to be seen.

The situation which should prevail after the FCC's expected ruling, will be that broadcasters will be permitted to use right hand circularly polarized antennas. Each antenna available on the market will need to be type approved and at least Harris, Jampro, and possibly RCA will be ready to begin type approval procedures. Harris already has high and lowband CP VHF antennas and Jampro has high- and lowband VHF as well as UHF models of CP antennas. Other models will probably be introduced at the NAB convention.

We are dealing with a matter of TASO grades where "degree" of improvement is concerned, and that is the

continued on page 62

DON'T SETTLE FOR LESS

MARCONI MARK VIIIB

The Marconi MARK VIIIB is the largest selling, fully automatic color camera in the world today. With all the features shown as *STANDARD* and *NOT OPTIONS*, it offers outstanding value without compromise. You may think we're expensive with all this luxury. Call us — you'll be pleasantly surprised at how competitive we are!

- Fully automatic registration
- Continuous auto centering from live scene
- Automatic color balance from live scene
- Electronic color temperature control
- Automatic self-diagnostic check out
- Choice of pick-up tubes
- Tilting view finder
- Standard or mini cable
- Portable MARK VIIIP uses same CCU

Let us show you the Marconi MARK VIIIB and prove that YOU DON'T HAVE TO SETTLE FOR LESS.

SEE US AT BOOTH NO. 106 NAB

Marconi Electronics, Inc.

100 Stonehurst Court • Northvale, New Jersey 07647 • (201) 767-7250

Circle 145 on Reader Service Card

basis of considerable disagreement. As it turns out, one man's 1.2 TASO grade improvement is "significant" while to another 1.2 TASO grades is "hairsplitting." In all fairness, the 1.2 TASO grade mentioned above is an average, that is: some viewers experienced much greater improvement and some experienced some degradation. All in all, it is fair to say that the great majority of viewers would experience some improvement.

It appears that the broadcaster who currently has a signal that suffers greatly from multi-path or "ghosting" ought to seriously consider CP. He is assured of a number of things. First, his signal will be received better by those viewers in his market using indoor antennas. Viewers using outdoor antennas probably will not notice a great difference. Secondly, he is also assured that the changeover will be expensive, and he will have to be the judge as to whether his improved reception will be worth it. Thirdly, the broadcaster electing to go CP is further assured of the avid interest of other broadcasters seeking to learn from his experience.

It must also be noted that if CP receiving antennas can be manufactured and marketed successfully, the viewer will experience a 3 dB boost in signal strength available to the TV set in the CP-CP mode.

The overall effect of the expected ruling is that at least CP will be given a chance. There is little doubt that somewhere there are some broadcasters that will determine that the benefits of CP are sufficient in their circumstances to warrant its adoption. When they go CP a great deal more stands to be learned. Then there will be further study, development, and improvement.

The benefits of CP will not lead to a stampede to this mode as feared by by CPB. Broadcasters are not known for their lack of caution. Doubtless, CP will progress market by market, and in markets where it does not demonstrate a clear superiority over HP, HP will remain.

CPB, in its comments, saw the spectre of stations advertising their switch to CP and creating a subjective sense of "improved reception" in the minds of the viewers. This, CPB felt, might lead to a situation where broadcasters would adopt CP in a "keeping up with the Jones' " sort of mentality. Since viewership in television seems to be determined more by program content than technical superiority this argument seems a bit shakey. For instance, broadcasters using VIR are not making big PR point out of it.

One point that does concern a great many people is the increased electrical consumption that would be required in the doubling of transmitter power. In this time of energy shortage and resultant increased energy costs, the higher electrical consumption could weigh heavily on the decision to go CP. This, of course, is a primary cause for further study and experimentation which can only take place when CP is authorized.

Few would dispute the fact that more efficient transmitters are desirable. It is conceivable that the prospect of a large market for CP will encourage the further development of more efficient transmitters in order to solve the problem of high energy consumption. None of the proponents of CP deny that there are problems to be solved but they have argued, and apparently successfully, that these problems cannot be solved by a refusal to go forward. **BM/E**

Two Stations Commit to CP

Two VHF TV stations, one highband and one lowband, have opted for CP antennas. The stations, WPBT, Channel 2, Miami, Florida and KBYU-TV, Channel 11, Provo, Utah, are both non-commercial, educational stations.

The stations have some other things in common as well. Both are embarking on major rebuild efforts and both have suffered from severe ghosting in the past. On the other hand, the decision to go CP was prompted by different considerations.

KBYU expects CP to help reduce the severe ghosting caused by even-ordered reflections in their mountainous terrain. Most of their audience resides in a valley between two mountain ranges that rise abruptly to some 6000 feet. Though most of the KBYU viewers use outdoor antennas, many in the Salt Lake area, which is actually closer to the transmitter site, use indoor antennas. Ralph Silver, chief engineer for KBYU, expects that these viewers will benefit.

KBYU will use a Harris antenna that is convertible to CP from HP. The problem of increasing power did not impress Silver at all, since part of the rebuilding, which will include a completely new plant, calls for more powerful transmitters anyway. KBYU will also receive a Harris 50 kW dual transmitter in parallel to replace their 10 kW transmitter which is currently putting out only 6 kW. Silver expects that KBYU will generate from the new transmitter about 24 kW in both the vertical and horizontal modes.

In light of the scope of KBYU's rebuild plans the decision to go CP did not represent that great an increase in the overall budget. WPBT, which is also building a brand new transmitter building and other new facilities on a $1.7 million budget, also felt that since they were undertaking such an enormous rebuilding effort they might as well go to CP on the gamble that it would be approved and result in improved service. The management felt that it could have played it conservative and planned on remaining HP but certain eventualities played into their hands.

First, the new tower to which WPBT is moving is a multiple station tower, with two UHF antennas top mounted and they had planned to use a panel type antenna anyway. Switching to CP with the RCA design they have selected would not result in significantly increased windloading. Moreover, since they are currently using an RCA tube type 25 kW transmitter, which is pulling about 40 kW line power, the new RCA 25 kW they have ordered should put out considerably more power without a commensurate increase in line power. The antenna height from the center of radiation will be increased from 680 feet to 900 feet. Altogether, the station expects, according to Steve Rogers, v.p. of engineering, to increase its ERP by about 40% in the horizontal plane from 81.3 kW visual to 100 kW visual.

The benefits that Rogers expects from CP include better penetration to indoor antennas in the Miami Beach area, where he estimates 50 percent of the viewers use some type of indoor antenna, and less ghosting.

WPBT's educational programming is carried on a number of local cable systems and additional systems are planned in the Keys region. Rogers feels that they might be able to work on a CP receiving antenna for the cable facilities and significantly improve the re-transmission of their signal. "Theoretically," said Rogers, "we might get double the field strength."

Rogers said, "We didn't want to be pioneers," but his belief in the potential of CP and its future is so great that whatever the risk involved, it is worth it.

Now Hitachi Covers The News...

Hitachi FP3030

Hitachi SK-70

Three Different Ways

The addition of the new Hitachi SK-80 camera to our existing line, now gives you three top performance Hitachi ENG cameras to choose from. Each camera also has the versatility to be applied to other non-ENG operations.

Hitachi FP3030 A low cost and lightweight (7.7 lbs.) completely self-contained portable color camera with built-in battery that is ideal for broadcast capability in ENG, as well as a variety of industrial applications. The FP3030 also features excellent colorimetry and sensitivity with registration-free tri-electrode single tube.

Hitachi SK-70 A modular system camera that can be converted easily from studio to portable use with superior broadcast performance in either mode. Digital command control unit is also available. The SK-70 is many cameras in one!

Hitachi SK-80 Totally self-contained ENG camera whose exceptional design and features are sure to be appreciated by broadcasters. Features three 2/3" Saticon tubes. Optional Gen-Lock available, as well as many other fine built-in features.

Hitachi SK-80

To get the complete scoop on ENG cameras, contact your Hitachi dealer today. And find out how much **more camera** Hitachi gives you for the price!

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

SEE US AT NAB BOOTH 228 SHERATON PARK

Executive Offices: 58-25 Brooklyn-Queens Expressway, Woodside, N.Y. 11377 (212) 898-1261
Offices in: Chicago (312) 344-4020 • Los Angeles (213) 328-2110 • Dallas (214) 233-7623 • Atlanta (404) 451-9453

Circle 146 on Reader Service Card

Turnabout . . . Evaluating Videotape Evaluators

By Leo P. Demers, Jr.

Evaluators are doing an important job but you need to know what jobs different types of evaluators are best suited to.

I USED TO HOLD THE WORLD SPEED record for rejecting videotape!

When the time arrived to pass judgment on the quality of a one-hour reel of videotape I could put it through the wringer in two hours and ten minutes. One hour test-record, one hour to view and evaluate the playback; then ten minutes to rewind the tape and type up the rejection report. A noble achievement!

Continuing the evolutionary process of Machine Replacing Man, a videotape "PROFILE" recorder entered the competition. Far superior to previous evaluators—all recruited from the human race—this unit couldn't miss a dropout . . . black or white. (You mean you didn't know there was a difference between a black dropout and white dropout besides the color?) Since the "Profile" recorder interfaces with the VTR, it registers when the VTR plays a dropout. In one hour this unit would deliver the most accurate account of a videotape's dropout level on a neat graph indicating the location of any problem areas. It would not be necessary to record a test signal, this unit would evaluate videotape using existing program material without danger of disturbing the material—a definite advantage. Also, the unit is not subjective as are the previously mentioned human evaluators. Since I'm a good loser, forfeiting my self-acclaimed world title to such an accurate unit as this was not a difficult pill to swallow, and besides, proper use of the graph would add more substance to the final evaluation.

Then it happened. Something called a "Stationary Head Videotape Evaluator." This unit would: clean the videotape surfaces—front and back; identify, locate and count dropouts and display these totals on a nixie-type numerical readout *while* they were occurring, it would subsequently rewind the videotape and clean both surfaces a second time while "packing" the tape with an even wind and tension on the reel, and ultimately present you with a typewritten account of all this information. The whole process takes ten minutes for a one-hour tape.

Yes, TEN MINUTES for a one hour reel of videotape! Could it be? Had engineering management throughout the industry wasted all those man-hours, head-hours and money evaluating videotape for years without finding a short-cut? I didn't think so. Or, had the "Profile" engineering people overlooked something? Most unlikely, since they also pioneered the development of videotape and were manufacturing tape when I was still rushing home from school to watch *American Bandstand*. Maybe it was the "Stationary Head Evaluator" (SHE) that was taking a short-cut.

To find the answer the field had to be narrowed down. What had been eating up most of the time during the evaluation process? Sitting in front of a television monitor viewing a video test signal for the real time length of a tape seemed to be the culprit . . . but, there was no other way! A legitimate dropout will only show itself under certain conditions. All of those conditions exist during the real-time use of videotape. Dropouts exist in some environments and flourish in others. These are some of the factors affecting dropouts: The dropout count of a given reel of tape would increase as much as 300% just by decreasing the *record* tip-penetration by 2.5 mils. So, a standard tip-penetration must be used to record the test signal. The video test signal makes an important difference to dropouts. A given size defect would exhibit itself as a more severe dropout if the signal on the tape were Hi Band instead of Low Band; and the

continued on page 67

Leo Demers is videotape engineer at WGBH, Boston.

Author Demers when he held "the world record" for evaluating videotape.

STEADICAM™

Video/Film Camera Stabilizing System (Universal Model)

Video, 16mm or 35mm! If you shoot handheld, you *need* STEADICAM – Cinema Products' unique camera stabilizing system currently revolutionizing video and film production methods all over the world.

Designed to provide total freedom of movement while recording extremely steady and jitter-free handheld moving shots of dolly-quality smoothness, STEADICAM greatly enhances the creative latitude of the director and cameraman while effectively *reducing production costs.*

Releasing the camera from the constraints of dollies, tracks, and heavy camera platforms, STEADICAM permits the camera to move with the operator as if it were an extension of his own body and part of his internal "servo-system," constantly adjusting and correcting for body motions, whether walking or running. And STEADICAM turns virtually any vehicle – car, boat or aircraft – into an "instant" camera platform.

Whether on location or on a soundstage, STEADICAM permits the *handheld* camera to capture the scene with a new sense of realism and a steadiness of image never achieved before. It is ideal for use in the videotaping or filming of television specials, documentaries, TV commercials, live theatre productions and concerts, sports, and other special events.

The "Universal Model" STEADICAM allows the camera to be easily removed and used *independently* of the system, on-the-shoulder or on a tripod. It also permits the use of *one* STEADICAM system *interchangeably* with any one of several handheld video, 16mm or 35mm cameras – an important feature for television stations and production houses using *both* video and film cameras.

"Universal Model" STEADICAM shown in use with TK-76 video camera, CP-16R 16mm camera and CP-modified Arri IIC 35mm camera. Other video and film cameras of the same general weight class can also be adapted for use with the STEADICAM system. For further information, please write to:

RCA TK-76 video cameras with STEADICAM systems are available directly from Cinema Products and its authorized dealers. Inquire about special TK-76/STEADICAM package prices.

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

VISIT US AT OUR NAB BOOTH #503 AT THE SHOREHAM

Introducing a Color Corrector for Electronic News Gathering.

Electronic News Gathering makes tough demands upon the broadcaster. Color imbalance and colorimetry problems are frequently encountered. Matching remote camera shots to indoor studio programs or assembling tapes from different locations or cameras is "chancy" at best. Often that fast-breaking story doesn't allow for camera rebalancing!

Thomson-CSF Laboratories now provides a solution to such difficult encoded signal color problems. With the Model 5500A Color Corrector, you'll be able to rebalance and match video signals *after* encoding. It can be used either after the play-back tape machine or following the microwave receiver during live coverage. In most cases, a noticeably improved color picture will result. For ease of operation, a Remote Control unit is included as standard equipment.

As an added feature, an optional automatic Sensor unit is also available to control the Color Corrector for telecine use.

Whether for Electronic News Gathering, tape production or telecine use, the Thomson-CSF Laboratories Color Corrector System should be working for you. Interested? Give us a call.

THOMSON-CSF LABORATORIES, INC.

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

Circle 148 on Reader Service Card

difference between Hi Band color and Black and White is staggering. The dropout count for a tape with a black and white signal would increase by ten times if the test signal were hi band color. So the frequency of the test signal has a definite effect on dropouts.

The recommended standard set-up for electronically counting dropouts, (RP-47 SMPTE), suggests the use of video color bars or black signal with sync and set-up as a test signal. The VTR video head should have a penetration of 2 mils and the electronic counter should interface with the VTR. This set-up differs from, and should not be confused with, the recommended set-up procedure for a standard recording.

The stationary head evaluators use, of course, a stationary head to record and sample the test signal. The heads have only surface contact, therefore no penetration; and the test signal used is not Hi Band or even Low Band or even video! As a matter of fact, on a scale of 1 to 10, 1 being the upper frequency (Hi Band) and 10 being the lower frequency (Low Band), I figured the test signal to be about a 25. This saturated digital test signal is recorded across the entire 2-inch width of the videotape then it is sampled by the "Read-Head" . . . sampled, in the true sense of the term. One evaluator's-read head, (actually a number of heads aligned across the width of the video portion of the tape leaving about 89% of the picture portion of the tape unchecked. If a scratch were not located within the path of one of the read-heads, it would go undetected. The remaining heads on the read stack are positioned at the outer portions of the tape to check for any edge damage, these are quite effective. In addition to having no penetration while reading a signal that's out in left field somewhere, these heads are reading in a lateral direction, real-time dropouts as seen by a rotating video head occur in a transverse direction, (across the tape).

So what!, you say. A bump is a bump, no matter what the direction. True—but consider this. A dropout of 5 microseconds, (SMPTE recommends 5 microseconds be a minimum duration for a dropout), is approximately 1/10 of a picture line when the transverse sweep of the video head sees it. Measured laterally and considering the speed of the tape and gap-width of the individual stationary read-heads, the SHE unit wouldn't see the 5 microsecond dropout. Combined with the fact that these units can't react that fast, they would miss even larger dropouts. The units require a certain amount of "Decision Time." One manufacturer specifies that dropouts of 100 microseconds or longer, (measured laterally), will be counted. The other SHE unit will count dropouts whose lateral length could span at least 1½ inches of tape, (about 3 video frames as seen by the 15 ips VTR). Playing back a dropout of such a magnitude might register about 3.2 on the Richter Scale.

What it all seems to mean is these units aren't counting actual dropouts as defined by SMPTE standards.

What, then, are these dropout counters counting? Tests I've conducted seem to indicate—as the manufacturers specify—when the test signal voltage drops below a predetermined level at the read-head for *the required length of time*, it will count as a dropout. Each manufacturer of the SHE units have set their own dropout criteria. These level variations appear to be tape defects, such as a slight wrinkle or an oxide wear-spot where the videotape was shuttled back and forward a number of times. These defects don't reveal themselves as "regular dropouts" during playback, but more as obvious tape damage. Appearing on the screen as "bursts of dropouts," (described by one manufacturer), or multiple dropouts. Unless these dropout-clusters occur within the path of a read-head and last at least the duration of the "Decision Time" they will go undetected. Single dropouts as we know them caused by dust particles or normal oxide wear are just not long enough and as a result, will not be counted by the SHE unit. For example, the "Profile" evaluation for a new hour-reel of videotape revealed 60 dropouts, the same tape on the SHE unit set at its highest sensitivity saw none of them—but the purpose is different.

Understand that it is difficult to reveal the same dropout in the same spot on a tape when VTRs are changed and new test signals are recorded. So changing test signals drastically has the same effect as the difference between the SHE and the VTR, as well as changing prin-

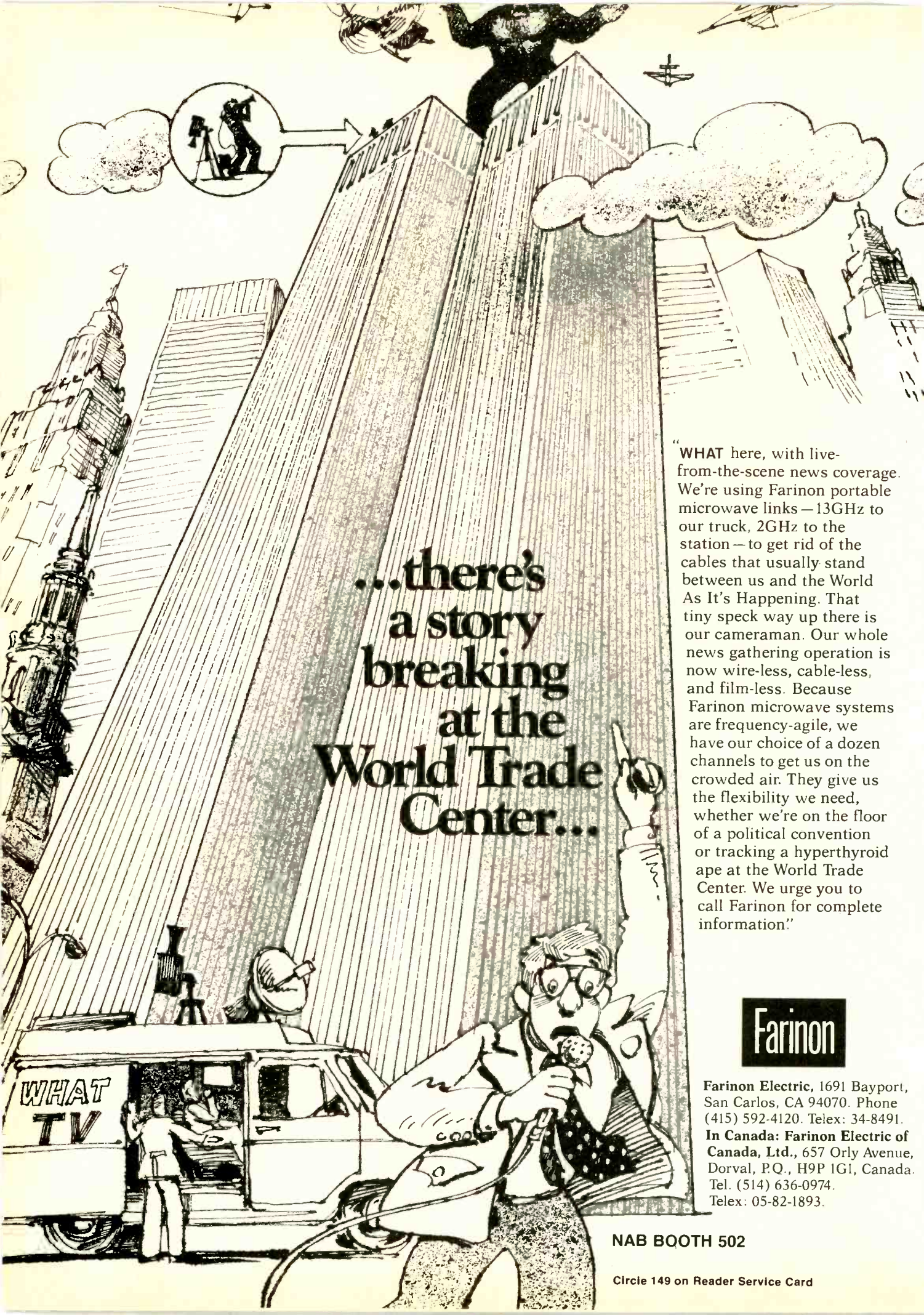
continued on page 69

Comments By Manufacturers And Others On SHE

BM/E decided to go to some of the manufacturers of videotape evaluators and seek their comments on the above article. In general, the manufacturers we talked to, Recortec, 3M and Magna-Tech, agree with Mr. Demers but wish to stress that SHE was never intended to provide absolute dropout evaluation for one-time mastering tapes. Instead, SHE is the most efficient way for evaluating large quantities of tape for gross dropouts. Many of the minute though recognized dropouts that would show up in a Profile evaluator would be taken care of by the VTR's dropout compensator. Recortec has always recommended that the user should view the output of the evaluator as a guideline; "If SHE says the tape is bad, it is definitely bad, but if SHE says the tape is good, it is probably good." A hierarchy of tape quality should be set up on the basis of the data from the tape evaluator. The best tape is used first and so on down the hierarchy until the statistical point is reached where the tape beyond that level is unusable.

Each of the manufacturers agree that a tape to be used for mastering should get an exacting examination from a tape profile evaluator—and even possibly a SHE as well since each device examines some different characteristics. In addition, the SHE performs the function of cleaning the tape and in this cleaning process, as much as 70% of potential dropouts are removed. Not to be overlooked, the economics of SHE are very good where time saved, head wear saved, and the ability to conserve expensive videotape is considered.

Studio Tape Exchange, which is in the business of supplying used tape to the industry, uses SHEs and states that even though a SHE will not reveal such things as "tenting" and "hard-core," procedures can be developed along statistical lines that make it possible for them to offer a 100% guarantee on their tape. S.T.E. has modified certain operating procedures for their SHEs and specially trained their technicians to evaluate the resultant data. Carole Dean, president of S.T.E., states, "Each tape is first run in order to get 'normalized' readings on a channel-by-channel basis. Then when we set our threshold levels for dropout detection, we know that we are examining a variation from the average for *that* tape rather than some arbitrary fixed values which may not be meaningful as one tests one type of tape and then another."



"WHAT here, with live-from-the-scene news coverage. We're using Farinon portable microwave links—13GHz to our truck, 2GHz to the station—to get rid of the cables that usually stand between us and the World As It's Happening. That tiny speck way up there is our cameraman. Our whole news gathering operation is now wire-less, cable-less, and film-less. Because Farinon microwave systems are frequency-agile, we have our choice of a dozen channels to get us on the crowded air. They give us the flexibility we need, whether we're on the floor of a political convention or tracking a hyperthyroid ape at the World Trade Center. We urge you to call Farinon for complete information."

Farinon

Farinon Electric, 1691 Bayport, San Carlos, CA 94070. Phone (415) 592-4120. Telex: 34-8491.
In Canada: Farinon Electric of Canada, Ltd., 657 Orly Avenue, Dorval, P.Q., H9P 1G1, Canada. Tel. (514) 636-0974. Telex: 05-82-1893.

NAB BOOTH 502

Circle 149 on Reader Service Card

Videotape Evaluators

cipals of recording such as eliminating tip-penetration altogether you can see that to get the dropout you just saw during playback to register on the SHE would be a startling rejection of the laws of probability! The variables cover too wide a range. Well, the stationary head evaluators have been "taking it on the chin" so far. In the race for the best videotape evaluator it's not exactly what I'd call a photo-finish because I don't believe they're all running in the same race. When considering an evaluator, all of the units should *not* be lumped together. The stationary head evaluators have evaluators have advantages the Profile evaluators don't have.

The Profile evaluation will reveal legitimate dropouts . . . but that would be its only contribution to your videotape operation. While the Stationary Head Evaluator-Cleaner does not; in my opinion, accurately count regular dropouts, it does significantly contribute to the reduction of tape dropouts and extending VTR videohead life as well as it quickly and reliably identifies splices and damaged portions of tape, (wrinkles, creases, edge damage). It's not to detract from the SHE to question its dropout-counting reliability since the rest of what it does is performed quite well.

It is essential the user understand what "SHE" is actually saying. When "SHE" says a videotape is *damaged;* be assured that it is and the VTR drop-out compensator will not cover it up. However, the burden of accepting a good tape for mastering is not, and should not be the sole responsibility of a Stationary Head Evaluator. If your tape facility is using a "SHE" as one would use a washing machine and ducking out for coffee while the tape completes its cycle, then SHE is not being used properly.

Which to choose? Well, to quote a rather threadbare cliche—"If the shoe fits, wear it." Should your videotape facility be production oriented and the product of a day's work is one master tape to be dubbed for distribution, then a Profile-type evaluator, (interfaces with the VTR), might best suit your needs. Since you're usually always dealing with brand new video tape stock rather than used tape. The master playback tape can be evaluated using its own video as the test signal *while* the dubbing process is underway.

However, if your tape operation requires using the same reel of a tape on a daily or weekly basis such as: news shows, TV station promos, or local productions, then the SHE unit would both extend the life of the tape while keeping you abreast of any physical damage caused by constant handling and usage. Videotape would probably be retired for physical damage in this sort of environment well before the normal dropout aging process.

Whatever method you choose to sit in judgement of videotape quality and detect the elusive dropout, be careful not to stop there. I've encountered a few people who are secure in the knowledge that every existing dropout in their videotape operation has been duly numbered and catalogued for the files. To be proud of such an achievement is as much a mistake as to resign yourself to living in peaceful co-existence with your dropout average, rather than trying to reduce it. **BM/E**

It's the New CEI-300.

It does everything you've ever wanted a professional color camera to do. And more than you ever thought possible. It's the camera for all seasons, for all reasons.

It's a studio camera in various configurations. It's a portable camera in various configurations. It's a ⅔" head. It's a 1" head. It's a self-contained camera. It's a system camera.

It meets or beats industry specs on every count and produces no-compromise broadcast quality pictures, even in ENG configurations.

It's totally modular, quick and easy to convert from portable to studio and vice versa.

It gives you the latest technology. A wide choice of system features. A wide choice of pickup tubes. A wide choice of lenses. A wide choice of options.

It's perfect for remote applications, for studio broadcasting, for commercial production, for quality ENG, for educational broadcasting, for industrial use, for medical television.

If you tried very hard, ordering just about everything available in the way of options—and there are a lot—you couldn't possibly spend more than $40,000. And with a degree of restraint you'll probably hold it to $30,000.

We'll be taking orders on a first-come first served-basis. We've already got a bunch in hand without even officially announcing the CEI-300! What's going to happen now? It might be a good idea to see us right away. Call or write CEI, 880 Maude Avenue, Mountain View, California 94040, (415) 969-1910.

See us at NAB, Sheraton Park, Booth 222.

TAKE A NEW LOOK

cei

Circle 151 on Reader Service Card

An Introduction To Digital Television Part II: The Sampling Process

By R.N. Hurst

IN THE FIRST ARTICLE in this series, we established the concept of digital television as a process in which the successive elements of a television picture are converted to a successive series of binary numbers, with each number's magnitude corresponding to the brightness of the element being represented by that number. These numbers, we said, are then processed or transmitted in lieu of the normal analog television signal, then converted back to the familiar analog format for viewing.

For many years, there have been excellent reasons for passing the TV signal through such a process, and we listed several of them in the first article—better signal-to-noise ratio, accurate reconstitution after transmission, "tweak"-free operation—to name just a few. However, none of these had the necessary economic impetus to compel the adoption of digital techniques. Therefore, digital television lay dormant from its inception, nearly 30 years ago, until about 1970, when LSI (Large Scale Integration) semiconductor technology made low-cost digital memories available. To use these digital memories to store TV signals, it was necessary to convert the signals to digital format. This provided a *strong* economic impetus toward digitizing the TV signal, so the old techniques were dusted off, updated, and put to work in a new array of television equipment.

A method for converting an analog television signal to digits was shown in Fig. 6 of the previous article, reproduced here as Fig. 1. This figure shows how the conversion-to-numbers process involves a *sampling* of the input signal—usually at a sample rate of either three times or four times color subcarrier—and also a *quantizing* of this sampled signal, a process which forces the sampled signal to take on, at a given instant, one of only 256 possible values. This quantized signal is then *encoded* to produce a *PCM* (Pulse Code Modulation) format signal, which is brought out on the eight wires emerging from the right side of the block diagram of Fig. 1. The overall process is called *Analog-to-Digital Conversion*, or *A-to-D Conversion*, and its net result is the change of a smoothly-varying analog television signal into a very-rapidly-changing stream of numbers expressed in binary form as a very rapid series of HIGH's and LOW's appearing on the eight wires emerging from the A-to-D Converter's output.

The Sampling Process

The sampling process is a very important first step in the conversion of a TV signal to a stream of numbers. As we pointed out in the first article, any signal must be sampled at a rate no less than *twice* its highest frequency component, if the signal is to be reconstructed accurately from the samples. For a 4.2-MHz-wide TV signal, this implies a sampling frequency of no less than 8.4 MHz, but practical considerations force that number up to at least 10.7 MHz, (three times color subcarrier), and, in some equipments, to 14.3 MHz, (four times color subcarrier).

In the last case, a new PCM word will appear every 70 nanoseconds, in order that the stream of PCM words may adequately describe the variations in the instantaneous video signal.

During the 70 nanoseconds that we observe the video signal and generate a PCM word to describe its instantaneous level, that video level can change considerably. For example, the subcarrier representing a saturated yellow bar could move through some 20 IRE units in that 70 nanoseconds. Since there are about two quantizing levels per IRE unit, the raw color signal could call for some 40 different PCM words during that 70 nanoseconds, leaving the system thoroughly confused.

If we are to describe an instantaneous level with a single PCM code word, it is necessary to *sample* the signal *very* quickly, at just the desired instant, and *hold* the resulting sample level until the corresponding PCM word can be generated.

This process is called a *sample-and-hold* process, and is the type of sampling most commonly employed in digital television systems today. Unfortunately, it carries with it a frequency response problem which must be compensated for. To develop this concept, we shall describe the spectra generated by various types of sampling, starting, for tutorial clarity, with a type of sampling not actually used in digital television, and progressing in two easy didactic steps to the problems of sample and hold.

Narrow-Pulse Sampling

Initially, let us consider what would happen if an analog television signal were sampled by an extremely narrow pulse, with no holding action at all between the samples. The arrangement might be as in Fig. 2a.

Here, an input signal is sampled by a train of very narrow 14.3-MHz pulses, giving a time-domain output of a series of spikes whose amplitudes trace out the time contours of the original signal. The *spectrum* of the process is even more interesting, and is depicted in Fig. 2b. We show on the left a simplified sketch of a TV-signal spectrum, which we allow to extend to 5.5 MHz instead of 4.2 MHz, because we are using 14.3-MHz sampling in this example. After passing through the sampler, the signal has a new spectrum which is a duplicate of the original signal's spectrum, plus a series of mirrored duplicates of the original signal spectrum clustered around harmonics of the sampling frequency, in a pattern very reminiscent of the carrier, harmonics, and sidebands of ordinary AM modulation systems.

If the sample pulse is extremely narrow, the pattern of "carriers" and "sidebands" will extend out toward in-

continued on page 72

Author **Hurst** is Administrator, Broadcast and Technical Training, RCA, Camden, NJ.

finite frequency, and each "carrier" and its associated "sidebands" will have the same amplitudes, relative to the other "carriers" and "sidebands." This amplitude will be considerably reduced from the original (input) amplitude, because as the sample pulse approaches zero width, the amplitudes of the "modulation products" approach zero, and the pattern extends out closer and closer to infinite frequency. It is important to know, moreover, that each set of "sidebands" is a faithful replica of the input spectrum.

Since the baseband (0 to 5.5 MHz) also appears in the output spectrum, and since the baseband output is likewise a faithful replica of the input, *the original signal may be recovered simply by low-pass-filtering the sampled signal output,* as shown in Fig. 3.

As the figure shows, the low pass filter's output differs from the input only in magnitude, and this difference is corrected by inserting some gain.

Sampling with a Wider Pulse

No practical system can sample with a pulse approaching zero width, for the output amplitude will be uncomfortably close to zero. If we sample with a pulse of a more reasonable width—say, 25% duty cycle, as shown in Fig. 4, then the sampled output signal becomes a series of pulses whose "tops" actually follow the exact curvature of the signal while the sampling switch is closed. The spectrum resulting from this type of sampling makes a sudden and distinct departure from the narrow-pulse case, for the amplitudes of the "harmonics" and their "sidebands" are no longer equal to each other, but are profoundly different, as shown in Fig. 5.

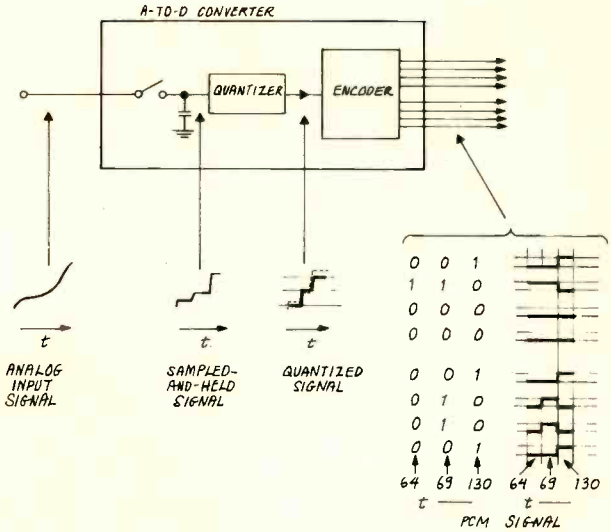


Fig. 1: The A-to-D conversion process, showing the sampling, quantizing, and encoding steps involved in the process. The resulting PCM signal is shown in both numeric and waveform formats.

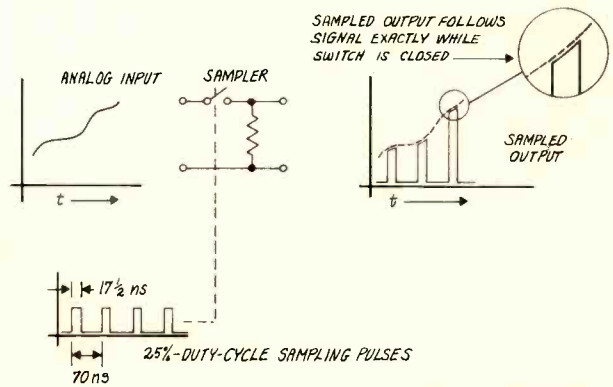


Fig. 4: Sampling with a wider pulse. The sampler shown does not hold the signal, but merely passes a "slice" of the signal during the time the switch is closed.

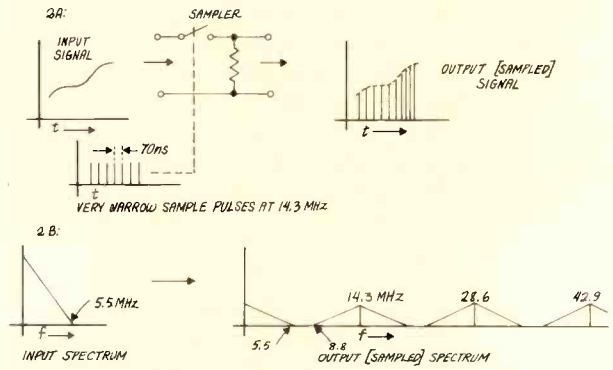


Fig. 2: Sampling with extremely narrow pulses converts the original signal's spectrum into a series of mirror-imaged spectra which are duplicates of the original spectrum, but centered around harmonics of the sampling frequency. Output amplitudes are reduced from the original, but all clusters of harmonics and "sidebands" are of the same amplitude, out toward infinite frequency.

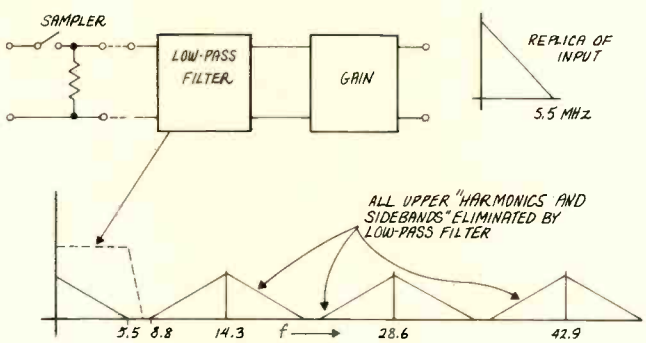


Fig. 3: To recover the original signal from the spectrum of Fig. 2, a low-pass filter is used to eliminate the undesired upper spectral components, and gain is inserted to restore the original amplitude.

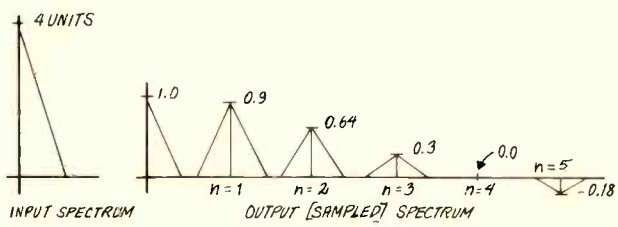


Fig. 5: The spectrum resulting from sampling with a 25%-duty-cycle pulse. Each successive harmonic group is reduced in amplitude by a factor derived from the mathematical gain factor sin x/x, as explained in the text. Note that the baseband signal, though reduced 4-to-1 in amplitude, may still be recovered by simple low-pass filtering.

In the first place, the baseband output is down to 4 to 1 from the input, because of the 1 to 4 (25%) duty cycle of the sampling pulse. In addition, the amplitudes of successive "harmonics," with their associated "sidebands," are progressively less as we go higher in the spectrum, finally vanishing completely at the fourth harmonic, and actually going negative at the fifth harmonic.

This progressive diminution of the higher harmonics results from the appearance in the mathematics of a term of the form $\frac{\text{Sin } x}{x}$. This is a mathematical function which occurs frequently in the study of sampling, scanning, and other communication phenomena. The function has a shape as shown in Fig. 6.

The particular mathematics for this type of sampling inserts a sin x/x "gain factor" of the form

$$\frac{\sin n\pi K}{n\pi K}$$

into the expression for the output spectrum, where n is the harmonic, (for example, n = 3 corresponds to the third harmonic of the sampling rate, or 42.9 MHz.); and K is the duty cycle, which is 25% in this example. Therefore, the third harmonic of the sampling frequency, along with its associated "sidebands," will be attenuated by a factor

$$\frac{\sin (3)\,(\pi)\,(0.25)}{(3)\,(\pi)\,(0.25)}$$

$$= \frac{\sin 2.36 \text{ radians}}{2.36} = \frac{\sin 135^\circ}{2.36} = 0.3$$

This is the actual number shown for the third harmonic in Fig. 5. The other factors shown in the figure can now be easily calculated by the reader.

It is important to observe, that for this type of sampling, the sin x/x factor acts as a single number modifying the amplitudes of whole clumps of frequencies. For example, the second harmonic and *all* its sidebands are modified by the same 0.64 factor, because the only variable in this sin x/x is n, the order of the harmonic. There is no frequency-variable f in this sin x/x—this will occur in the *next* type of sampling we shall study.

Sample and Hold

To fulfill the needs of a digital TV system, we must sample as quickly and accurately as possible—almost with the extremely-narrow pulse of the first example—but must then *hold* the value thus obtained to allow time for the quantizing and encoding circuits to act on the value acquired by sampling. Such sampling is represented in Fig. 7.

This is the type of sampling used in digital television, and it produces yet a different spectrum. The mathematics which describe this spectrum also contains the ubiquitous sin x/x, but this time the x is changed from the $n\pi K$ of the previous example to $f\pi T$, where f is frequency, and T is the duration of hold—about 70 nanoseconds in our example system. This means that the sin x/x shape of Fig. 6, instead of yielding a single number, for each n, to act on a clump of frequencies together, will vary smoothly with f across the entire frequency band, confusing the relationships among the sideband frequencies of a single harmonic. Most significantly, the sin x/x produces a roll-off of the baseband itself, as shown in Fig. 8.

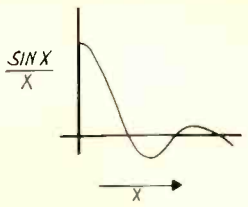


Fig. 6: The sin x/x function. This function appears frequently in the study of sampling, scanning, and other communication-related topics.

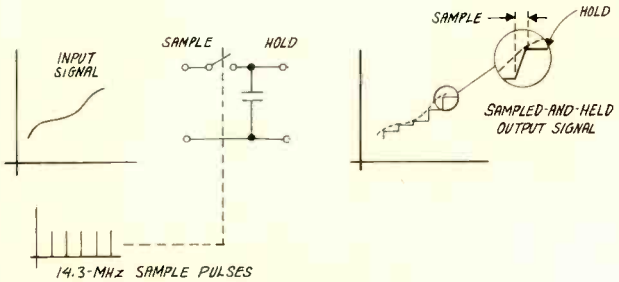


Fig. 7: A sample-and-hold sampling process. This is the process most commonly encountered in digital television systems. It unfortunately carries with it a frequency response problem.

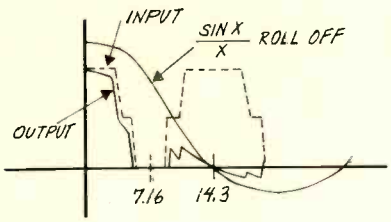


Fig. 8: The roll-off resulting from sample-and-hold type sampling. The original spectrum, shown dotted, has been shown with a step in it to aid in visualizing the roll-off action. This roll-off, which is 11% at subcarrier, must be compensated.

f, MHz	πfT	$\sin \pi fT$	$\sin \pi fT / \pi fT$	dB
0	0	0	1	0
1	.2194	.2176	.9919	− .07
2	.4388	.4248	.9082	− .28
3	.6582	.6117	.9293	− .64
3.58	.7854	.7070	.9002	− .92
4	.8776	.7692	.8764	−1.14
5	1.097	.8898	.8111	−1.82
5.5	1.207	.9344	.7742	−2.22
7.16	1.571	.9999	.6365	−3.92
14.3	3.1416	0	0	

Table I: The sin x/x roll-off for various frequencies, using a 14.3-MHz sample rate. Intermediate steps in the calculation are included in the table as a tutorial aid.

This means that the output of a sample-and-hold system cannot be recovered with a simple low-pass filter, unless some compensation is included for the frequency-response degradation caused by the sin x/x response of the sample-and-hold process.

The amount of frequency-response degradation can be calculated by inserting the correct values into

$$\frac{\sin f\pi T}{f\pi T}$$

For example, the sin x/x roll-off at subcarrier is

$$\frac{\sin (3.58 \times 10^6)\,(\pi)\,(.069 \times 10^{-6})}{(3.58 \times 10^6)\,(\pi)\,(.069 \times 10^{-6})} = 0.9002, \text{ or } -0.92 \text{ db.}$$

Other values are tabulated in Table I, where you can see that there is over 2 db of roll-off within the 5.5-MHz passband.

The roll-off for 10.7-MHz sampling (three times subcarrier sampling) is even more pronounced. The reader, aided by a good pocket calculator, can easily generate a 10.7-MHz version of Table I by replacing hold-time $T = .069 \times 10^{-6}$ with $.093 \times 10^{-6}$. On some calculators you must convert the numerator number from radians to degrees (by multiplying by 57.3) before punching the *sine* button.

Where to Compensate?

The presence of a roll-off immediately raises the question of where to compensate—ahead of the digital process, or after it? At present, there is no clear answer to this question. Various engineers have weighed the same factors and arrived at opposite conclusions.

If a compensating roll-up of 2.2 db at 5.5 MHz is inserted *ahead* of the A-to-D conversion, the subcarrier amplitude going into the A-to-D converter will be increased by about 11%. Since the number of levels available for quantizing is fixed at 256, the overall signal level must be reduced so that the taller subcarrier will fit into the available space. The augmented subcarrier is less susceptible to quantizing distortions, but the diminished monochrome is even more susceptible.

On the other hand, a non-pre-compensated system will offer better monochrome performance, but worsened color performance, for the converse reasons. Furthermore, the post-compensation "roll-up" will tend to accentuate any noise or distortions in the digital portions of the system.

You can easily see how reasonable men might reasonably disagree on which approach is the better. At present, you will find some manufacturers using pre-compensation, and some using post-compensation. It will be interesting to see which method finally wins out, for one *must* win to permit the eventual digitizing of large systems.

Sampling Rates Revisited

In the first article in this series, we pointed out that a 4.2-MHz-wide TV signal could *theoretically* be sampled at an 8.4-MHz rate, and, also in theory, the resulting samples could be used to re-create the original signal with accuracy. This requirement for a minimum sample rate of *twice* the highest frequency to be transmitted is known as the *Nyquist Criterion*. We also pointed out, however, that the use of a sampling rate at the mathematical minimum would put impossible requirements on the low-pass filter at the output, which separates the "harmonics" and "sidebands" from the desired baseband being recovered. Our discussions above on sampling and filtering now give us the tools to clarify this further.

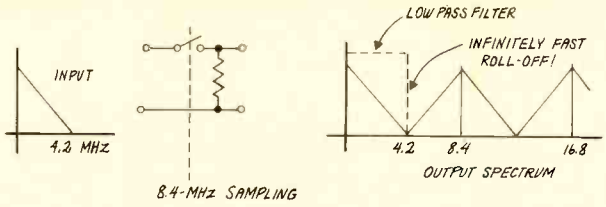


Fig. 9: Sampling at the Nyquist minimum of twice the highest signal frequency results in a spectrum which cannot be filtered correctly except by a filter with an infinitely fast roll-off—which is a physical impossibility.

If a 4.2-MHz-wide system is sampled at 8.4 MHz, the resulting spectrum is as shown in Fig. 9. Note that the lower "sideband" spectrum of the 8.4-MHz sampling frequency extends exactly to the upper end of the baseband signal. A low-pass filter designed to recover all of the baseband would have to be flat to 4.2 MHz, and then produce an infinitely steep roll-off in order to reject the undesired 4.2-Mz sideband of the 8.4-MHz sampling frequency. Building such a filter is a physical impossibility. The Nyquist Criterion is therefore only a mathematical guide; practical filter considerations actually force a higher sampling frequency.

For example, consider a 4.2-MHz-wide system sampled at 10.7 MHz. The resulting spectra are diagrammed in Fig. 10, along with a sketch of a possible low pass filter.

The filter should be flat to 4.2 MHz, and should roll off to produce sufficient attenuation for the undesired 6.5-MHz component from the "lower sideband." If 40 dB rejection is sufficient, this filter's transition interval must progress from full response to 40 dB attenuation in much less than an octave. Furthermore, practical filters for this service should pay special attention to harmonics of subcarrier, and will therefore have a designed-in null at 7.16 MHz, the second harmonic of subcarrier.

The reader should note particularly that if the *input* filter—the one *ahead* of the digital process—fails to limit the input frequencies to no more than 4.2 MHz, the baseband and lower sideband of Fig. 10 will creep toward each other, closing the gap at *twice* the rate at which the input filter is allowing unwanted frequencies through. When these two touch, or even when they're so close together that the output filter can no longer separate them, then the "toe" of the lower sideband becomes a permanent and unwanted addition to the output video signal, causing an effect known as *aliasing*. It is therefore vital that the input filter to any piece of digital equipment do a meticulously good job of eliminating any frequencies above the design bandwidth.

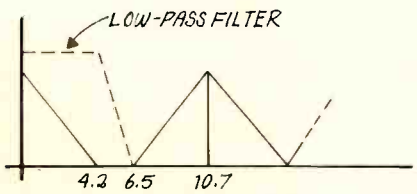


Fig. 10: Using a sample rate about 20% greater than the Nyquist minimum allows room for a reasonable roll-off rate for the filter. Sampling at 14.3 MHz yields even better filter management.

Next in this series . . . .

In our next article, we will have a look at the various techniques currently available for A-to-D conversion, as well as some techniques which may become important in the future. **BM/E**

How did these broadcasters get ahead of the competition?

KING TV5

"The Compositor has excellent fonts-- they're clean, they are sharp-looking, and they are distinctive... we have as much memory storage as we're ever going to need. You can change directly from any page to any other page without any problem whatsoever-- you don't have to stick with the original sequence. The Compositor gives you super flexibility."—Don LaCombe, KING Production Manager

"The Compositor's on-air display is a marvel... head and shoulders superior to the competition. We've virtually discontinued using hotpress for supers."
—Galen Daily, KRON Program Manager

KRON · SAN FRANCISCO

WTMJ TV

"We used the Compositor for the first time on election night. We were very pleased with the clarity and color. I'm sure we had the best election show in town that night." —Donald Loose, Manager WTMJ News Operations

"We used our new Compositor system during the election and were very happy with it. It seemed to me that the character edging made our display easier to read than the competitions'. We moved ahead of the other stations soon after the election results started coming in." —Terry Harrison, KTVK-TV Engineer

KTVK 3 TV

KGW TV8

"...the election went like clockwork--I couldn't have asked for anything better. The Compositor display is clear and easy to read...you just glance at it and you've got it. We were ahead of the competition getting numbers on the air." —Tom Craven, KGW Production Manager

"We were well ahead of the competition election night... the reason, I feel, was in large measure due to the Compositor. It's easy to use, and prevents a great deal of possible error. Where the TM unit really shines is its computer interface with the character generator, which eliminates the extra step of manually entering the election results."
—Bill Gill, WOTV News Director

WOTV GRAND RAPIDS

These broadcasters agree: with or without the TED election reporting option, the new Compositor I Titling/Graphics System offers a superior on-air look. With graphic-quality fonts and instant access to any page in memory at any time, the software-based Compositor I provides the fast on-air operation demanded by production personnel, the artistic quality demanded by advertisers, and the competitive edge that broadcast management is looking for. For details, please call Jack Daniels at (801) 972-8000.

Compositor I

TeleMation
the discovery people
P.O. Box 15068, Salt Lake City, Utah 84115

SEE US AT NAB • BOOTH 421 • WASHINGTON HILTON

Circle 153 on Reader Service Card

More Room, Easier Operation For Microwave Remotes Under New Rules

By John Leonard

New FCC frequency assignments and operation rules for broadcast remotes became final on November 22. This article outlines the new frequencies and services for broadcasters.

THERE IS NEW ROOM for broadcast remotes on the microwave lanes and it comes not a minute too soon. The push for microwave space is hot in many large cities. The Federal Communications Commission, after a long period of study and consultation with the industry, issued a new set of frequency assignments and operating rules that were to become effective last June. But a petition from the National Association of Business and Educational Radio (NABER) contesting some of the frequency assignments persuaded the FCC to hold up the effective date.

The NABER petition was rejected November 22 and the FCC set the effective date of the new broadcast remote rules for the same day.

Only frequencies in the old Group N, 450-451 MHz and 455-456 MHz, are actually altered, as described in detail below. Existing Groups L and M, 161.25 MHz and 170.15 MHz, remain unchanged. Previous group K, although not actually changed in specific frequencies, has been divided into two segments. K1, 152.87 MHz through 153.35 MHz, is shared with industrial users. Broadcast use is contingent upon no harmful interference being caused to the industrial users; applications for new licenses (but not renewals) will require a statement showing what procedures will be taken to avoid that. Further, K1 is excluded for use on board aircraft or by a new group of users of remote pickup service-networks. Finally, new or modified licenses for K1 will not be granted for bandwidths in excess of 30 kHz and maximum deviation of 5 kHz.

Group K2 covers those frequencies assigned to broadcast service only (except networks)—161.64-161.76 MHz. A network is defined as an organization which produces programs available for simultaneous transmission by 10 or more affiliated stations, and having distribution facilities or circuits in service at least 12 hours each day.

New assignments, 450-455 MHz

The most significant frequency alterations have occurred in 450-455 MHz band. The 450-451 MHz and 455-456 MHz spectra that make up the previous Group N are mirror images as to frequency usage. These two 1 MHz bands have been divided into five groups with some 38 new frequencies being assigned.

The first of the new groups, N1, represents a total of 12 of the original N frequencies, with bandwidth reduced from 100 kHz to 50 kHz, each, maximum deviation to 10 kHz each (see chart).

Twenty-four new frequencies are established with Group N2, with bandwidth of 25 kHz each and maximum deviation of 5 kHz each. This group is ideally suited for use with communications-grade equipment.

The services specified for Groups N1 and N2 are, in order of priority: (1) emergency and pending emergency relating to safety of life and property; (2) program material to be broadcast; (3) cues and orders, and other related communications immediately necessary to accomplish a broadcast; (4) operational communications; (5) tests or drills to check standby or emergency circuits.

A new service: telemetry

The new Group P (see chart) is for a new type of service—operational communications—including telemetry tone, tone and signalling (but not personal paging). At last, AM and FM broadcast stations have a separate service specifically for telemetry return. No longer needed is a subaudible tone on the AM carrier, or use of the SCA channel on FM.

All remote pickup frequencies are available only on a shared basis. No exclusive assignments are provided. The Commission, in establishing Group P, hopes that all stations will make logical use of Group P with this consideration in mind. Although there are no requirements for directional antennas, the Commission sincerely hopes that they will be utilized as aids to interference-free operation.

But identification of a transmitter operating in this service will be required. Either F1 or F2 emissions can be used for such identification. Requests will have to be made in the filing for a license to utilize F1 or F2. The Commission has indicated that the use of these forms of identification will be allowed.

Group R (chart) consists of ten frequencies, with maximum bandwidth of 50 kHz each and maximum deviation of 10 kHz each. Group R is limited to the transmission of program material and cues and orders immediately necessary thereto. Operational-type communications are not permitted.

The final new group, Group S, is two 100 kHz chan-

continued on page 79

Mr. Leonard is vice president, Marketing, Moseley Associates. This article is adapted from a paper given to the NAB Regional Seminar, New York, November, 1976.

Sitting Pretty in Virginia.

Rank Audio Visual have just delivered their first Broadcasting Audio Console in the U.S.A. to W.L.E.E., Richmond, Virginia.

If you'd like to know more about the Broadcasting equipment available from Rank Audio Visual, please contact the **Collins Radio Group,** Dallas, Texas or visit the Rank Organisation's **stand 409** at the **Washington NAB**

Rockwell International

Rank Audio Visual Limited, England.

Collins Radio Group, Dallas, Texas 75207. (214) 690-5310

Circle 160 on Reader Service Card

Introducing the Duca-Richardson Series 4000. Simply the most advanced production switcher ever created!

Booth 529 (Shoreham) at the NAB show.

Circle 155 on Reader Service Card

Color Coding
Simplified operation and reduced chance of operator errors are realized through color continuity of all video paths.

15 Button Keyboards
Easier selection of patterns, transitions, key sources and quadrant presetting is possible through the use of keyboards on the function modules, downstream keyer and quadrant selector.

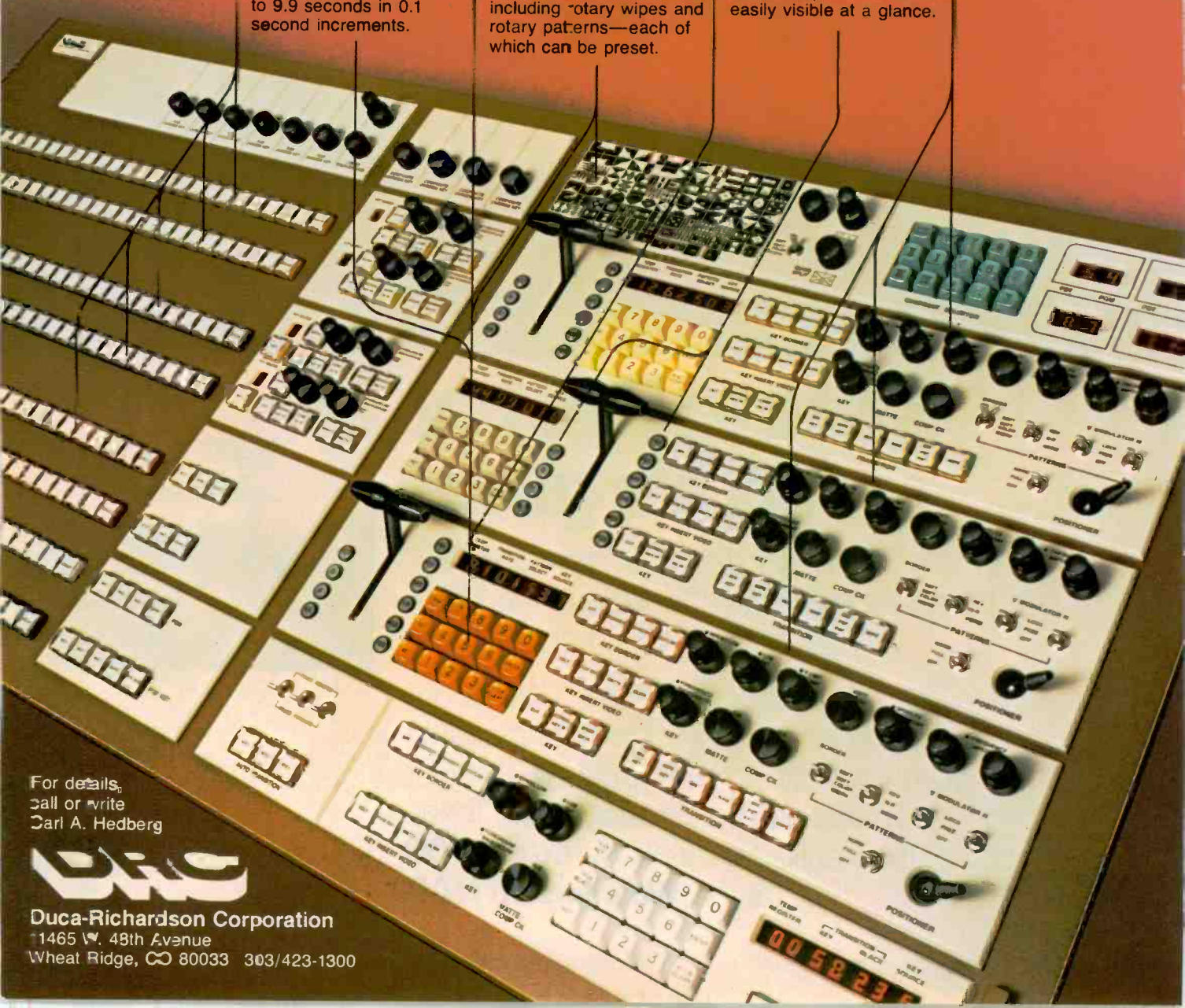
10 Key Sources
6 chroma keys, the B Bus, Preview Bus and 2 external keys are selectable as key sources, and any one can be used as a composite chroma key source.

Function Modules
All basic switcher functions are consolidated on the function modules for ease of operation.

99 Time Choices
Automatic transitions can be preset from 0.1 to 9.9 seconds in 0.1 second increments.

99 Pattern Choices
You get top creative flexibility from 99 patterns, including rotary wipes and rotary patterns—each of which can be preset.

Status Lights
Status indication of all switcher operations is easily visible at a glance.



For details, call or write Carl A. Hedberg

Duca-Richardson Corporation
11465 W. 48th Avenue
Wheat Ridge, CO 80033 303/423-1300

nels (chart), retained on a temporary basis to see if a need exists for handling composite stereo remotes. As with Group R, this group is limited to the transmission of program material and cues and orders immediately related thereto. Should you currently be utilizing 450.95 MHz or 455.95 MHz, a one-year time period is provided to select a new frequency. It will be necessary only to select a frequency appropriate to the bandwidth of your equipment and notify the Commission in Washington of the frequency being substituted and when use will begin.

One important point: with Groups R and S, set up exclusively for program material, there should be less of the congestion currently being encountered in metropolitan areas.

Licensing changes

In a second general area of change, the FCC says that licenses will now be issued for remote pickup systems rather than for specific transmitters. The licenses will contain a maximum/minimum number of units (transmitters) to be included under a single license. The Commission will assign a call sign for an entire system. A licensee of that system will then assign a unit designator to each of the stations (transmitters) in a system.

It is understood that the FCC is studying a "block" system which would restrict group licensing to certain blocks, with the aim of maximizing spectrum usage by keeping narrow-band equipment out of wide-band channels. Further information on this will be available at a later date.

However, there are several types of services which will require separate licenses. These include stations operating in Groups I and J that provide communications alongside an aural or TV STL or intercity link. Base stations which provide standby program circuits from places where official broadcasts may be made during war, threat of war, or state of peril or disaster; base stations providing air connection circuits; and base stations participating in EBS. Another grouping is for mobile stations licensed as a system; this is to say, where mobile-only stations will exist without a base stations. An example of this would be a system providing one-way program feeds rather than communications as well as possible on-air service. Automatic relay stations will also require a separate system license.

As part of the licensing procedure, the new Rules require that, within 120 days following the grant of a license, the minimum number of mobile units authorized in a given license must be installed and maintained in operating condition. Further: temporary authorizations are going to be much harder to obtain under the new Rules. A special temporary authorization (STA) normally will not be issued to allow operation of the system or station while an application is being processed. It is my recommendation that, should you be considering a special temporary authorization, this section of the rules be examined very closely.

Equipment: type acceptance for all

A third section of the new rules specifies that all equipment used for remote services must have type acceptance. All new applications, or those for changing equipment after the effective date, and prior to one year from the effective date, must be type-accepted equipment. During this one-year time frame, Commission approval must be obtained before replacing any existing authorized transmitter with a transmitter that has not been type-accepted. All filings up to one year from the effective date may continue to specify existing equipment provided no harmful interference results from failure of this equipment to meet the newly-established technical standards.

All stations, regardless of the original date of license, must meet the new technical standards two years from the effective date of the new rules. This includes the authorized bandwidths and deviations as well as spurious emission specifications and frequency tolerances. Equipment currently type-accepted under Parts 21, 89, 91 or 93 of the Rules and Regulations that do not exceed the newly-established power output specifications may be used. This equipment, in essence, will be considered automatically type-accepted under the new rules.

Here are the important technical specifications: power output is established as no greater than 100 watts. The exception to this is aircraft equipment which has a 15 watts maximum. The spurious and harmonic specifications have been tightened over those previously applied to remote pickup equipment.

All transmitters will power output above 3 watts must be equipped with an automatic means of preventing excessive modulation. Tighter frequency tolerances also will apply for all frequencies above 25 MHz. As an example, transmitters operating in K1, K2 and L and M and with a power output above 3 watts in either mobile

continued on page 81

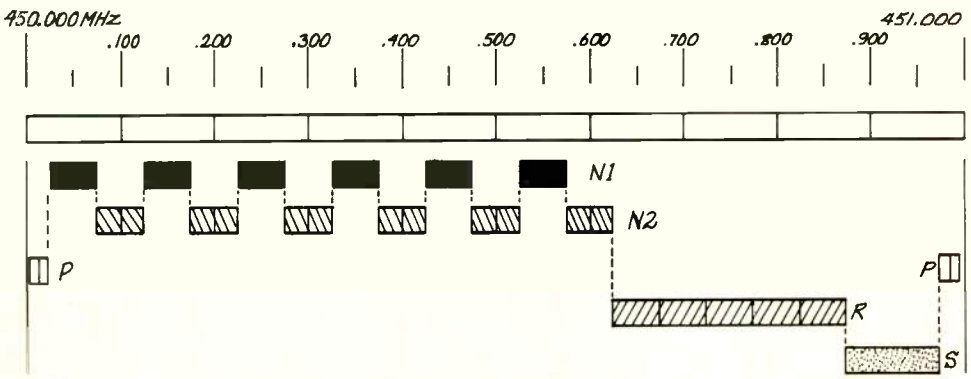


Chart shows new frequency assignments in 450-451 MHz band; those in 455-456 are the mirror image (order reversed), to double the bands shown, make 38 new frequency assignments. Service assignments are described in story; brand new are the P channels (telemetry) and S (composite stereo).

NOW! AN 'ENG' BROADCAST CAMERA AT HALF THE PRICE AND TWICE THE QUALITY!

THE GBC CTC-7X COMPLETE & SELF-CONTAINED FOR LESS THAN $20,000!

INCLUDES—CAMERA... VIEWFINDER... 6X ZOOM LENS... PICK-UP TUBES... BATTERY BELT WITH CHARGER... *PLUS THESE OUTSTANDING FEATURES*—SELF-CONTAINED, no backpack; HIGH SENSITIVITY—broadcast pictures at 20FC; usable pictures at 5FC; +6 db BOOST; PRISM OPTICS; BIAS LIGHTS; DIGITAL AUTOMATIC WHITE BALANCE; VERTICAL INTERVAL COLOR BARS; ENHANCER; 1½" CRT ELECTRONIC VIEWFINDER

NOW IN STOCK FOR IMMEDIATE DELIVERY
FOR FAST ACTION CALL TOLL FREE 800-221-2240

GBC CLOSED CIRCUIT TV CORP.

NEW YORK:
74 FIFTH AVENUE
New York, N.Y. 10011
(212) 989-4433

WEST COAST:
20620 SOUTH LEAPWOOD AVENUE
Carson, California 90746
(213) 538-4770

BOSTON • WASHINGTON D.C. • CHICAGO • DETROIT • INDIANAPOLIS • ST. LOUIS • FACTORY: PRINCETON, N.J.

Circle 156 on Reader Service Card

or base stations service will have frequency tolerance of ±0.005%. Base stations operating at 450/455 MHz will have a tolerance ±0.00025%, and mobiles in this frequency range, ±0.0005%. In the 450/455 MHz band, these tolerances will apply at all power levels. *Broadcasters interested in any of the new remote assignments should study the technical requirements closely.*

The new rules require that the frequency of a station authorized and operated with an output power in excess of 3 watts shall be measured when the transmitter is initially installed and at intervals once every calendar year at a period not to exceed 14 months apart. Another relaxation: the hand-carried and back-pack-type transmitter power output limits have been increased from the previous maximum 1 watt to 2.5 watts.

New operation requirements: easier

A number of changes are aimed to make operation easier. The remote license will now be posted with the broadcast station license. Each transmitter operating position, however, must be provided with a label. This label should provide the following:

A. Call sign
B. Frequencies
C. Unit designator (if applicable)
D. Name and address of licensee
E. Call letters of associated broadcast station or stations
F. Any special conditions as might be set forth in the license.

Operator requirements are as before: study 74,468(c) for station and operator responsibilities. The broadcast station call letters or the network identification will also suffice for identification.

But as part of the new Rules, a licensee may now operate out of his home area for a period of up to 30 days without notification to the Commission if no interference results. This is meant to imply that, should you plan on operating out of your home area, you must coordinate the frequencies to be utilized to insure that you do not interfere with any licensee in the area you are entering.

Logging: less to do

The final change, and the most dramatic, eliminates the requirement to maintain a detailed log of remote operations. An operating log is still required, but it may be viewed as more of a maintenance log than an actual operating log. Entries that must be made are, for example, when the licensee specifies painting or lighting of the tower, as outlined under Part 74.49. Entries on this count must be made whether or not the transmitter is ever used.

An entry is required for frequency measurements and another for any servicing of the transmitter. It is also required under the new Rules that, when a licensee assigns unit designators, a record be maintained of these assignments. It appears to me that the operating log may be the logical point to maintain this information.

These logs may be kept in any convenient location, so long as they are readily available when required for inspection by the Commission. The retention period of this information is two years. And the FCC retains the right to specify, at a later date, other information that must be entered. **BM/E**

Topics Of "Beginning Digital TV" And "Beyond ENG" Draw Record Numbers

Emerging roles of one-inch VTRs and digital video devices captured rapt attention of over 730 who attended the SMPTE Winter Television Conference. Standards urged.

End-on view of nine member Future of One-Inch VTR panel.

WITHOUT A DOUBT, the Winter SMPTE Television Conference has emerged as the cutting edge technical conference of the year. In 1976, at Detroit, the theme of ENG and digital TV drew over 600—double the number who attended in years before—and it was a precursor to what would be significant at the NAB Convention a few months later. The same could be said about the '77 San Francisco meeting, Jan. 28-29. Although the winter meeting comes too early for new equipment being readied for NAB to be unveiled, the shape of things to come is strongly hinted at.

The hottest topic at San Francisco was quad-quality one-inch VTRs, both on the exhibit floor and from the podium. On the floor, Bosch Fernseh showed a new portable BCN which will reappear at NAB. IVC was promising an American made version, the BCN 8020, ready for inspection by March. The deck will eliminate the need to stack two reels on the same coaxial shaft. The production model of the Sony BVH-1000 one-inch was on display. Ampex highlighted the VPR and RCA was demonstrating a BCN. With all that emphasis on one-inch, Recortec people said they regretted not displaying their one-inch system, the VM-1000.

The very great future potential for one-inch VTRs was pointed to repeatedly from the podium as speaker after speaker addressed himself to applications Beyond ENG*—applications in producing commercials, sports, local affairs programs, mini-documentaries, and drama. Joseph A. Flaherty, vice president and general manager, CBS Television Network, played tapes of such applications, all of which are now being done regularly using field portable equipment except for drama productions. And the latter is coming, said Flaherty. He showed demonstration tapes made at CBS' Television City Studios (Hollywood) comparing 35mm film output with that of TV studio-and portable cameras recorded on one-inch BVH Sony recorders. The quality was such that one-inch tape techniques look promising indeed. Twelfth generation dubs, for example, were broadcastable. The clear implication is that since new portable TV equipment can be used in the classic film style (recording raw footages with a single camera and editing later), more and more production will go the route of electronic cinematography. Flaherty foresees future production being a mixture of classic TV and classic film styles but both performed using electronic equipment. In some instances, shooting will take place with multiple cameras each connected to its own recorder but through a switcher so that the director can record much of the show as he would like to see it the first time around. Only a minimum amount of post production editing would be necessary (see *BM/E*, January, p. 62 for an illustration of this hook-up). In other instances, single camera techniques can be used and the entire production edited after the raw footage is captured—probably in a non-sequential manner. Film shooting ratios of 20 to 1 or so could be practiced and costs would be less because tape could be reused. Flaherty sees a typical TV entertainment show being shot half and half with savings of up to 40% in below the line as a result of using reusable tape.

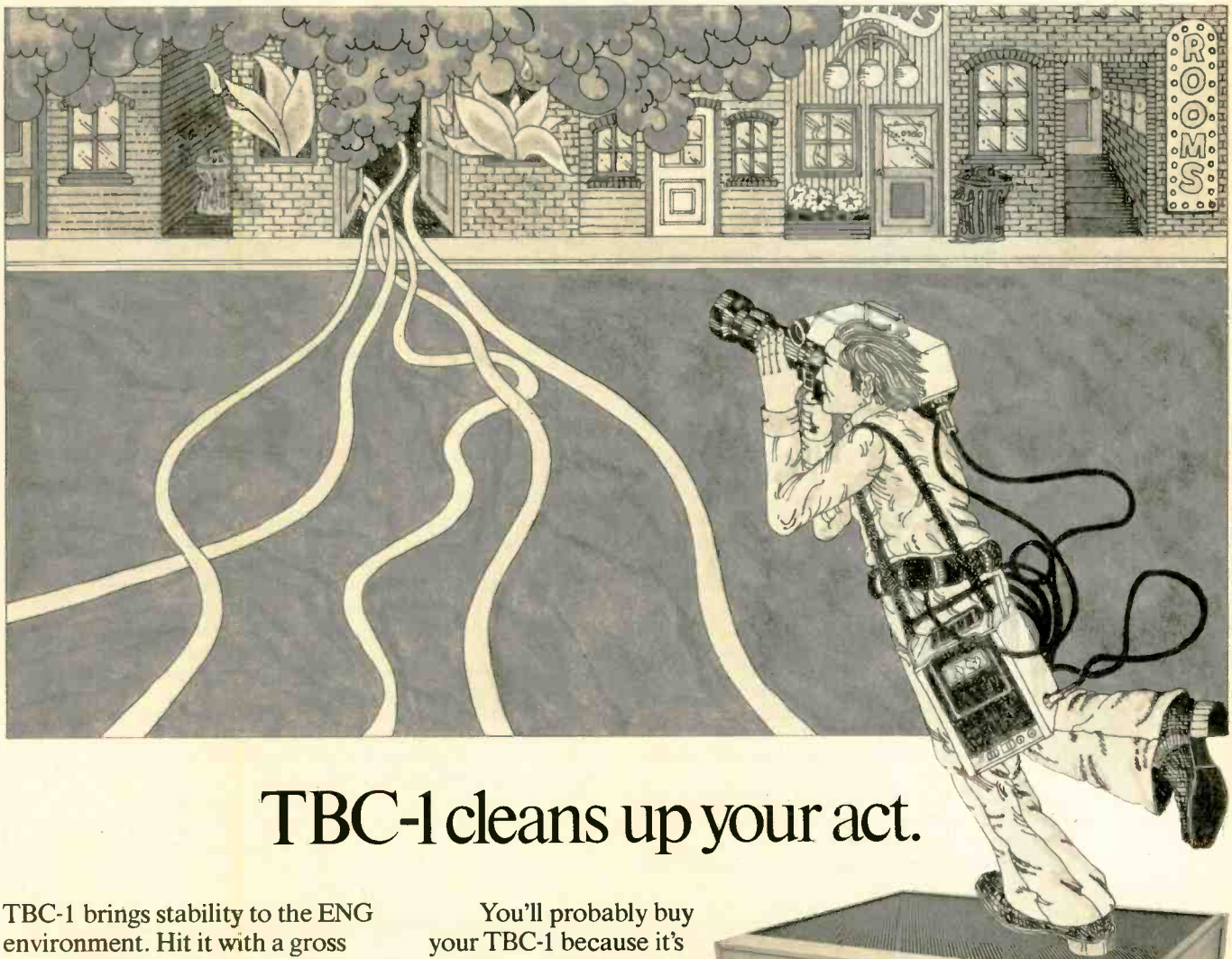
After reviewing how the ABC network used portable equipment in covering news, the Democratic and Republican National Conventions, sports, and the Olympics, Issac Hersely said he, too, saw a clear need for the one-inch recorder for variety and comedy shows. (For sports and news, he foresaw the possibilities of a ½-inch format as a means to lighten battery operated recorders. Such recorders need be "record only," said Hersely.)

The ¾-inch machines are inadequate for news in Europe, Dr. Boris Townsend of The Independent Broadcast Authority, UK, said, largely because of the limited bandwidth and resolution of the ¾-in. U-matic. (In Europe, the 625-line standard—5.5 MHz bandwidth—shows up the limitations of the ¾-in. U-matic format.) If 3rd generation tapes are necessary as is often the case when signals are relayed several times within the Eurovision network, pictures are pretty bad. But so far, the EBU Ad Hoc Group on ENG is not looking to the one-inch machines. Rather, to make the ¾-inch machine work, the group is thinking of adopting a 525-standard for transmitting signals among users so that the limited

continued on page 84

*In exploring the dimension of electronic field production beyond ENG, several new acronyms turned up. EFP, of course, is the shorthand way of saying electronic field production and it was used frequently by Bob Paulson in his paper, "After ENG, What?" Paulson helped popularize that term as principal author of *BM/E's ENG/Field Production Handbook, Guide to Using Mini Video Equipment*. Dr. Boris Townsend of the Independent Broadcasting Authority, UK, used END whimsically to stand for Electronic News Delivery and Electronic News Documentaries as well as the e-n-d. Issac Hersley of ABC Television Network, said that ABC sports group used the term ESG for electronic sports gathering.

You have one-inch in the studio and ENG in the field.



TBC-1 cleans up your act.

TBC-1 brings stability to the ENG environment. Hit it with a gross overload, say 20 television lines, and it'll still hold the picture together better than any other TBC on the market. Used with any non-segmented helical scan VTR, this new Ampex product will produce unsurpassed picture stability.

Correction range of a TBC-1 is more than six horizontal lines. Memory is 10 lines. Options include drop-out and velocity compensation, heterodyne color, and a special accessory to handle non-servoed helical VTRs.

The remarkable performance of a TBC-1 comes from a unique combination of "averaging" and line-by-line correction techniques. No other time base corrector uses both; no other time base corrector can match TBC-1 performance.

You'll probably buy your TBC-1 because it's so easy to use. Uncrate it, plug it in and forget it. It thrives on neglect, and works without fans, filters, moving parts or "tweaking."

There's a built-in sync generator in the TBC-1, and advanced diagnostics (should the need ever arise). But there's one more enormous capability that sets the TBC-1 apart from all other time base correctors: It's the only one in the world that can deliver broadcast quality slow motion and freeze frame material from an Ampex VPR-1.

TBC-1. The wide-application digital time base corrector Ampex developed for helical users who can't take chances.

AMPEX

Complete technical and performance specifications are available in a free brochure. Write us at 401 Broadway, Redwood City, California 94063, or call (415) 367-2011.

Circle 157 on Reader Service Card

Visit Ampex at NAB. We'll be in the Lincoln and Monroe Rooms of the Washington Hilton Hotel.

resolution of the ¾-inch U-matic will be less noticeable. Although one-inch recorders as a means of remedying the problem has not been considered so far by the EBU group, it does dub to 2-inch at the earliest moment.

The Swedish Broadcast Authority, according to Uno Nilsson, does not feel the ¾-inch machine is satisfactory

continued on page 86

A Possible Compatible Format For Professional Quality Non-Segmented One-Inch Helical Scan Video Tape

The following statements are extracted from the CBS-ABC white paper delivered to SMPTE.

Two professional quality video tape machine types using non-segmented one-inch helical scan formats are now commercially available. One machine uses one head to record each active field of video and a second head to record the vertical sync interval (the so-called "head-and-a-half" machine). The second type does not record the entire vertical interval, but regenerates the vertical sync information lost when the video head is out of contact with the tape while traversing the gap caused by the omega wrap (the so-called "single head" machine). Video tapes recorded on either of these machine types are not interchangeable with video tapes recorded on the other.

This document specifies for consideration one possible format which would permit interchange of tapes between these two machine types.

Magnetic Tape Format. One possible tape format which would permit the interchange of a video tape recorded on a head-and-a-half type machine with a video tape recorded on a single head type machine is shown in Fig. 1. Two audio tracks are located at the top edge of the tape. Video is located in the center, with one field of video contained in each track. The sync record is below video. A combined control track and SMPTE time code track is at the bottom of the tape. Alternative 2 has a third audio track in the space provided for the sync record in the case where sync is regenerated.

The format adopted shall meet the following requirements:

a. A minimum of two independent, completely unencumbered audio recording channels which permit recording of uncorrelated audio program sources, as well as independent post-recording, shall be provided. Neither track shall be overwritten by other information tracks.

b. Adjacent odd and even video tracks shall contain all the information in odd and even video fields plus lines 17 through 21. Recording and reproduction of lines 17 through 21 shall in every respect match performance during the active video to preserve accuracies of VIT, VIR, SID, and other data recorded on these lines.

c. The format shall provide space to record and reproduce all of the information that is now, or may in the future, be contained in the entire 21-line vertical blanking interval.

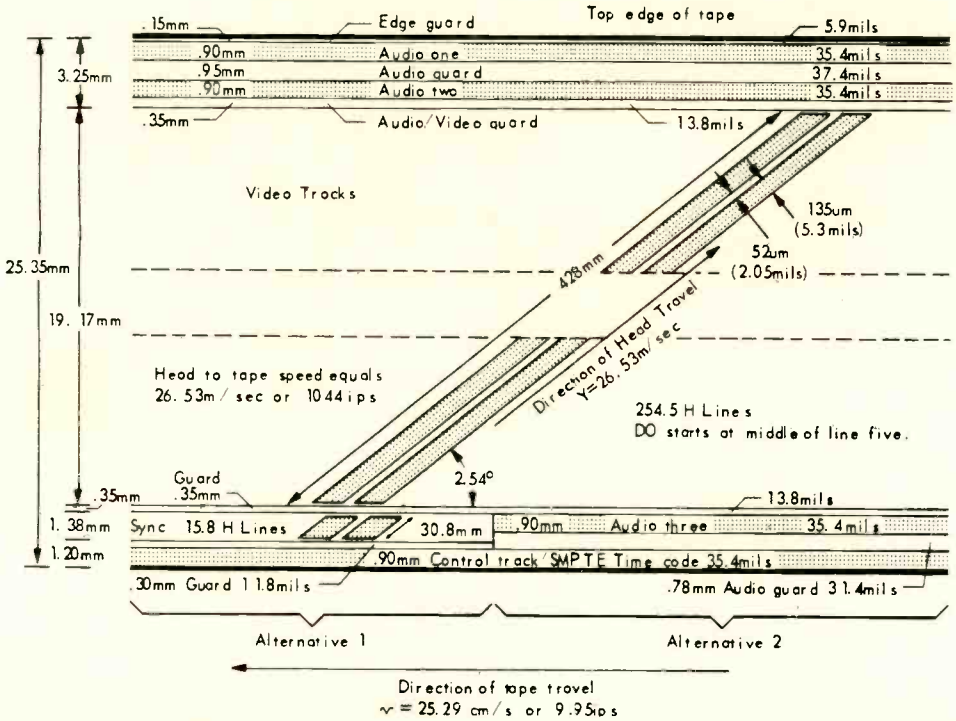
d. The longitudinal separation of the corresponding audio, video, and control tracks shall be held to the absolute minima to aid tracking accuracy and facilitate the design of compact tape transports for field recording applications.

In addition to the above, the white paper had a section entitled "System Performance." In the section, it asked for performances equal to or surpassing the best high-band quadruplex performance. An interchange S/N of 48 dB was asked for. Audio requirements were a S/N ratio of 58 dB with crosstalk at 50 dB. The control track should permit time code address data to be read over a speed range of .1 normal to 70 times normal.

A section on editing called for a flying erase, bidirectional search, jitter-free jogging, still frame and a continuously variable speed range of at least five times normal, forward and reverse.

The white paper also called for the possibility of accommodating broadcastable, slow motion and still frame. It also said that the provision for simultaneous (confidence) playback heads (while recording) for video, audio and control tracks would be desirable.

The white paper suggested that all of this be offered at a price of $50,000 or less for a complete operating system.



A possible standard format for one-inch non-sequential helical machines.

About the only thing our new 3M D-8800 Titling System can't do is spel.

If you can spell, you can create video excitement never before possible with the new dual-channel 3M Datavision D-8800 Titling System. That's because we've combined two fast, programmable microprocessors with some innovative video engineering to produce a flexible video graphics system that'll make you look great on the tube, whatever the job.

At the 8800's control console, you can make titles and credits using up to four complete type fonts at a time, chosen from our varied and extensive library. You can change from one font program to another letter by letter, generate letters and words in 8 different colors, and in several sizes at the touch of a button. You can even control the letter spacing!

On the 8800, not only will your words be gorgeous, you can present them just the way you want 'em, too.

You can initiate roll and crawl at several speeds and adjust both the roll and crawl masking to achieve just the 'right' look. And you can also select crawl position and roll and crawl direction. An inter-active panel display 'walks' the operator through every move, so complicated effects are easy to make and error free.

All graphic font and title information is stored on floppy discs for quick, easy program changes and retrieval. And the 8800 features numerous custom fonts and other options, to help you create those very special images you want for your station.

If you want great video graphics, put your best font forward. Take a good look at the new 3M Datavision Model D-8800.

Try out the 8800 yourself at booth #411 during the NAB show in the Hilton Hotel.

3M COMPANY

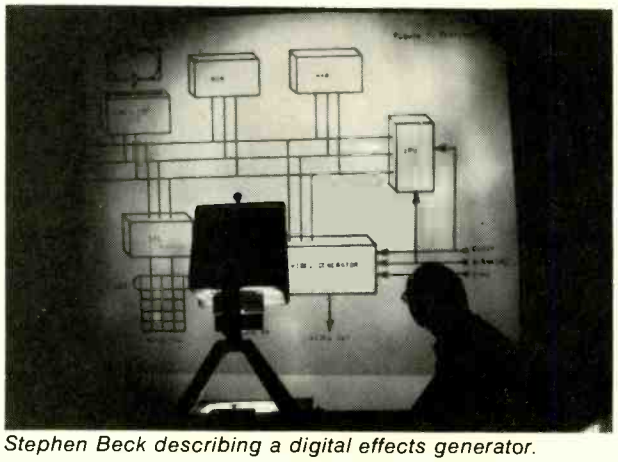
Circle 158 on Reader Service Card

for news or field work. The quality of film cannot be matched when one uses the 625 line, 50 cycle, standard. Chroma noise comes through. Nilsson says he has great hopes for the one-inch machines to improve the situation. The less expensive one-inch machine could become the principal recorder in regional networks, Nilsson said. A one-inch BCN-50 is currently being leased for experimentation and Nilsson expects to evaluate the VPR shortly (the Sony BVH-1000 would be evaluated too, Nilsson said, if a PAL version becomes available in Europe).

Capping the day devoted to Beyond ENG, was the international panel discussion entitled "The Future Role of One-Inch Videotape Recorders." Manufacturers on the panel made it clear that one-inch machines are here for real. Bosch Fernseh reported through panelist Henry Zahn, that it has delivered 130 units since the BCN's introduction at the International Television Symposium in Montreux in 1975. Zahn said the BCN series will evolve into a family of recorders. A record-only portable, lighter in weight than the current 44 lb. BCN 20, is planned and cassette versions are also planned. An editing unit incorporating frame grabbers will also be forthcoming (such a feature estimated to cost about $5000 will offset somewhat the inherent edit advantage that the non-segmented helical units have in that they produce a complete field per head pass). In the playback mode, Zahn envisioned a bank of decks operable on a random access base.

Carlos Kennedy, A-V production manager for Ampex, reported that VPR-1 units are now being delivered and that a VPR-10 portable unit will be ready for delivery early in 1978. Kiyoshi Yamakowa, research director for Sony in Tokyo, confirmed that the BVH-1000 is in production (25 have been delivered to the US) and that other more portable units are being studied. To complete the picture on such one-inch units, moderator Jim Lippke, editor of *BM/E*, reported that IVC would be showing a portable system compatible with the BCN format, at the upcoming NAB Convention, and that NEC would be introducing yet a fourth machine.

Broadcasting organization on the panel, Marcial Auclair, Canadian Broadcasting Corp., Uno Nilsson, Swedish Broadcasting, and Boris Townsend, IBA, all indicated interest in one-inch. CBC has been evaluating the VPR-1 for some time. It has done some testing of the BCN series and hopes to soon evaluate the Sony. CBC would pick at least one system as a one-inch standard. As already mentioned, Nilsson of Swedish Broadcasting will be evaluating at least two systems; the VPR and the BCN. Townsend of IBA foresaw a role for the one-inch but stressed the difficulty of integrating new standards into a system; experience indicates overall savings are dubious.



Stephen Beck describing a digital effects generator.

The lone producer on the panel, Ed Dudkowski of Dudkowski Associates, and a pioneer in the use of field portable equipment, vigorously affirmed the need for a one-inch machine which offers broadcast quality. Teleproduction panelist Dick Hill of Consolidated Film Industries and Blair Benson of Teletronics, indicated they would continue to master on 2-inch quad machines. (Teletronics has recently bought ten RCA super high-band units with pilot but would add one-inch machines as necessary to serve client needs.) Hill foresaw one-inch machines becoming incorporated as editors for direct edit without a transfer to other helical units for off-line edits or to quad for on-line editing which is now common. Hill saw a real spurt in the use of one-inch if standardization around a single format could come about. The moderator reported that a limited survey of producers and teleproduction houses found both these groups convinced that future growth would depend on just how fast Ampex or Sony could establish a leadership role. If a compatible standard were to evolve, growth would be revolutionary.

Catching both panelists and the audience by surprise was a proposed standard for non-segmented format machines offered jointly by CBS and ABC. In limited circulation was a white paper on the subject, co-authored by CBS and ABC. This paper was transmitted to the SMPTE by Flaherty of CBS with the request that SMPTE undertake a study with the objective of coming up with a compatible format for single-head non-segmented machines. (Ed. note: On Sunday, January 30, the videotape committee of SMPTE formed two subcommittee groups to study compatible formats—one group under the chairmanship of Fred Remley, Univ. of Mich., will tackle formats for single-head machines; the other, under Merle Thomas, PBS, will study compatibility of the segmented format already endorsed by four manufacturers, Bosch Fernseh, Philips, IVC and RCA.)

Are the manufacturers likely to agree to a compatible standard or as members of the subcommittee will they make the committee work impossible by an unwillingness to accept compromise? Panelists Kennedy and Yamakawa were not able to comment on the format suggested by CBS-ABC but endorsed the notion of a standard as desirable. In the interim, both companies are expected to vigorously market their present formats. They can hardly do less since the BCN format has a head start in the race for dominance.

Should Ampex and Sony see the possiblity of agreeing on a compatible standard that would at the same time offer them the possibility of retrofitting units already delivered, progress should come fast. The first subcommittee meeting is set for Feb. 23-24.

Digital video progress underscored

Digital TV progress and promise was the subject of day two at the SMPTE Winter Television Conference.

continued on page 89

Get the LIVE LOOK

Rank brings new quality, fidelity and ease of film-to-video transfer

With the new Flying Spot MK3 Telecine, you can expect and get superb reproduction from color or mono, positive or negative, 16 or 35 mm film, or slides—all on the same transport.

Here's a film chain with no camera, no lag, no complex optics, no intermittent projectors—not even a lamp house. It has a silent capstan drive with shuttle forward and reverse. Electronic *Cinemascope* panning handles 16 or 35 mm, full frame.

It is designed to deliver what you have always wanted in film reproduction—the immediate look of live video from film and all the quality, color, definition and contrast that you shot, or bought, with the film.

Arrange for a demonstration. Call Neil Kempt (312) 297-7720 or write for literature:

Rank Precision Industries Inc.
411 East Jarvis Ave., Des Plaines, Ill., 60018.

Flying spot TELECINE by RANK CINTEL

RC-177

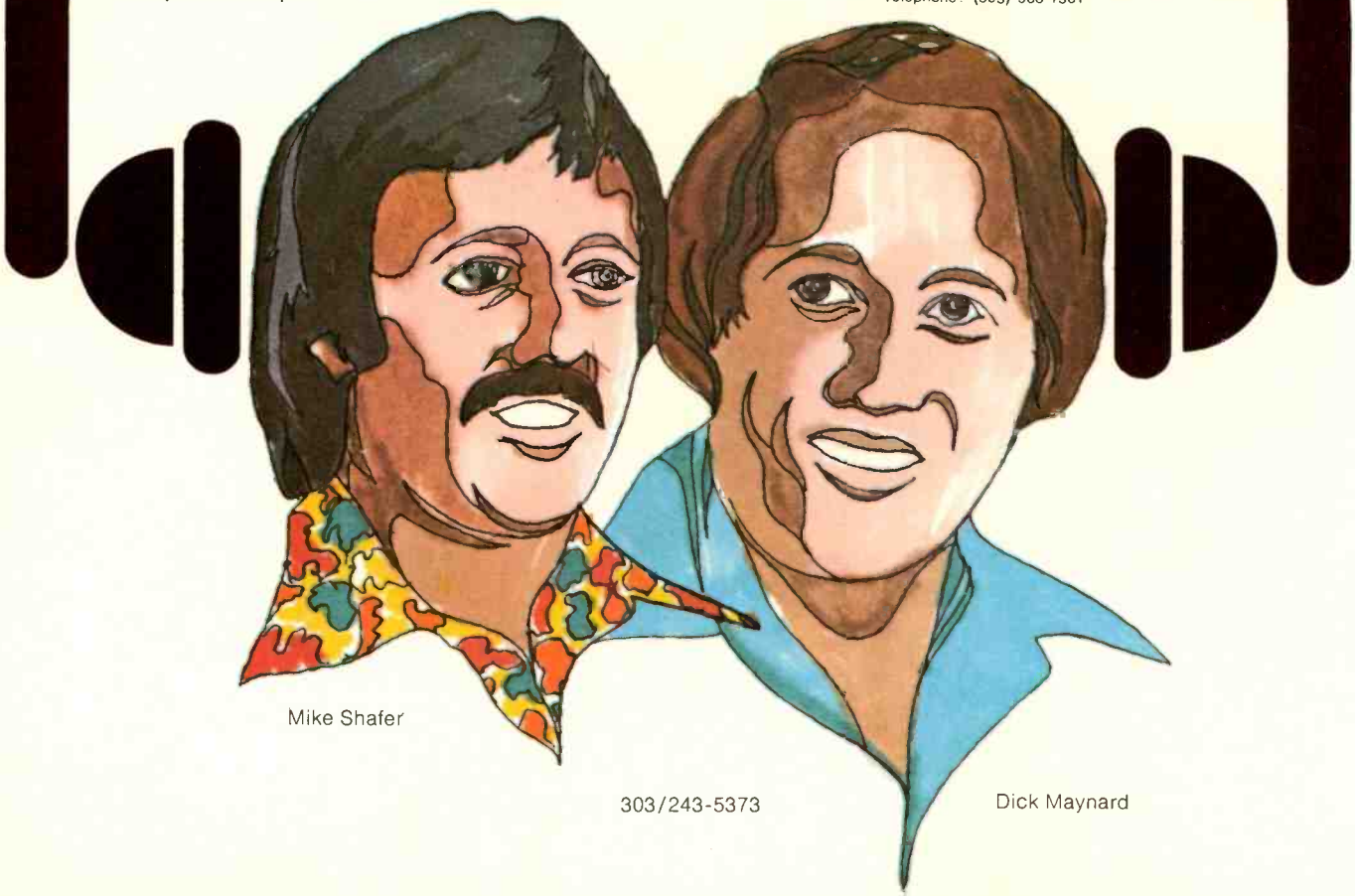
SEE THE LIVE LOOK AT NAB BOOTH 409 (Hilton)

Circle 154 on Reader Service Card

The CETEC Broadcast Group is really worth listening to.

Mike Shafer and Dick Maynard are the voice of the *good* group of CETEC professionals in the Rocky Mountain States. ☐ Their customers listen to them. They listen to their customers. ☐ Jim Hayes, KODI, Cody, Wyoming, wanted to make his news guys more productive. He wanted his guys chasing news, not reading history. ☐ So he automated with CETEC Schafer. ☐ Ray Ricci, KOLL, Gillette, Wyoming, designed his new 24 hour, 7 days a week, stereo FM around a CETEC Sparta transmitter and CETEC Schafer automation. ☐ 28 days later he was in the black! ☐ Dell Wood, KRKE, Albuquerque, New Mexico, wanted to program his FM with a progressive rock format. But, he had to be certain he would be competitive and efficient. ☐ So he automated with CETEC Schafer. ☐ Mike and Dick are used to listening and solving. They've been there before . . . Mike as CE for KREX AM/FM TV, and Dick as GM of KREX AM/FM. ☐ All of our voices in the field have been involved professionally . . . as owners, managers, program directors, or engineers. ☐ Wouldn't you, as a *professional broadcaster,* prefer to talk to a *broadcast professional?* ☐ . . . about the good group of products from Schafer, Jampro, and Sparta.

Cetec Broadcast Group
The Broadcast Divisions of Cetec Corporation
75 Castilian Drive Goleta, California 93017
Telephone: (805) 968-1561



Mike Shafer

303/243-5373

Dick Maynard

Circle 161 on Reader Service Card

SMPTE Conference

Program co-chairman, Joe Roizen, visually portrayed the impact of digital TV on our lives in a slide presentation that ranged from depicting how Jupiter surface shots reached earth as a result of digital transmission to the use of bits in editing microprocessors. Neither of these examples are pure digital video but they did illustrate how the world of digits is engulfing us.

As a tutorial, Frank Davidoff of CBS reviewed the basics involved in digital TV: sampling frequency, quantitizing and video compression. Davidoff predicted that we would see more and more black boxes—including a number of video manipulators.

The advances in analog-to-digital converters were described by Walter Kester of Computer Labs, Inc. The industry has moved from A/D converters that take up a rack full of space to those fitting in the palm of your hand.

Digital manipulation is a broad term embracing digital special effects generation. Stephen Beck demonstrated some of his work in creating special effects. Using digits as an input as opposed to the traditional analog signal, Beck created a variety of pleasing patterns. One such artistic effort was entitled "video weavings."

Eugene Leonard, Systems Resources Corp., sees digital devices such as video games providing more agreeable content for consumers' TV screens than much of today's studio programming. With the prospect of wideband fiber optics replacing twisted parts of telephone wires, interactive games can be played across the nation, point to point. Alternately, customers could order entertainment via a fiber optic system. Leonard foresees broadcasters having to shift emphasis from distributing programs to creating new kinds of programs. Because the cost of semiconductor and other exotic memory types is coming down rapidly, Leonard says shapes and patterns can be easily stored in digital devices. These can be added to conventional character/graphics generators to accomplish new and different things inexpensively. Whole sets or stage backdrops could be created from material stored digitally, Leonard said. He foresees such devices, including 600 slides of still store, being inexpensive and affordable by most every station.

In a more immediate vein, Yves Farjoudja discussed digital and analog enhancement techniques and Brian Matley of Micro Consultants, Inc. described how digital frame store synchronizers can be used optimally. (More details on frame synchronizers and Leonard's digital store concepts can be found in *BM/E*, February.)

Designing a practical signal system for digital video recording (such as electronic still store) was the subject of a paper by Luigi Gallo of Ampex.

In a long paper but one that had the audience vying for the chance to be the first customer, Charles Rhodes of Tektronix described a new instrument that will measure video signal transmission parameter digitally. It is a device whose time has come.

With so many digital black boxes emerging, there arises a need for some kind of standards to facilitate inputting and outputting. Any standardization that will aid system development will be slow in coming through, reported Charles Ginsburg, who heads SMPTE's Digital Study Committee. It is simply too early to determine what such a standard should be. **BM/E**

NAB '77 Convention and Exhibition Will Be A "Capital" Show

Benefiting from new technology and new FCC rules, exhibits will be overflowing with new products, equipment, services. NAB itself overflows, taking up three hotels.

IT HARDLY SEEMS POSSIBLE that the NAB Convention and Exhibition can outdo itself year after year. But it looks like it will happen again this year in Washington D.C., March 28-30. Perhaps not in attendance—*BM/E*'s sample polls last month (see Feb.) indicated very few radio engineers* making the trek to our nation's capitol—but in terms of new equipment, the show will be exciting. Add to that the appearance of high ranking persons in government (including, perhaps, President Carter) and you do indeed have a capital event.

The new technology that is giving broadcast equipment designers a field day traces primarily to microprocessors, analog-to-digital converters, and frame grabbers—digital disc and semiconductor memory types. All three exhibit areas, the Shoreham, the Sheraton Park and the Washington Hilton, will have example after example of microprocessors controlling this and that. Microprocessors are in editing equipment, "intelligent" VTRs, in "smart" switchers. They control lighting systems and run TV cameras through automatic adjustments. They are the heart of the new ATS systems. They run automation systems. Advances in digital to analog converters and semiconductor memory systems (smaller size, lower price) have ushered in a new era of digital video and audio as the equipment descriptions that follow show.

The FCC has helped. Recent rules affecting remote broadcast frequencies, automatic transmitter systems (ATS), satellite antennas, and the imminent rule authorizing circularly-polarized TV antennas have brought on a host of new equipment. Such FCC moves as increasing non-duplication programming hours on AM-FM stations has spurred syndicators to broaden their services. They, too, will make NAB '77 exciting.

But there is still another ingredient that will make the NAB exhibits outstanding aside from LSI semiconductor chip advancements and FCC foresight and that is the ingenuity of equipment product designers themselves. Certainly an area where this has manifested itself is in that of audio processors but you'll spot hundreds of examples in the paragraphs that follow.

*A high percentage of radio managers will be there—67%—and every TV station will be represented by managers or engineers.

About That Equipment Highlighted In This Issue

In our usual editorial call for information on equipment to be shown at NAB, we asked manufacturers to submit longer "feature article" material on products that represented significantly new approaches. Not all exhibitors were in a position to feed such information to us by our closing date (early Feb.) and some, of course, wanted to spring a surprise or two at NAB and therefore withheld information. We are sure we have not covered some important topics. Our May Show-In-Print issue will, expectantly, remedy that.

The big forward thrust in audio processors

Technical advance and rising sophistication among radio listeners have combined in the last couple of years to initiate a sharp upward thrust in the quality of available audio processing equipment. Helping the trend get under way, too, is the growing willingness of radio engineering personnel to express dissatisfaction with inadequate audio quality. And station managements have clearly responded to the trend by raising their interest in audio processors from 43% of those surveyed by *BM/E* last year to 58% this year.

Last year the Orban "Optimod" and the Thomson-CSF Model 4111 were highlighters of the new trend. Both are back after a year of strong sales.

This year, Harris Corporation is introducing a combination of units aimed, that company says, to hit the top in processing performance. With their new FM exciter using Digitally Synthesized Modulation (DSM), combined with their new processor, Model MSP-100 (Maximum Signal Processor) which has tri-band automatic gain control and automatic attack and release times, Harris seems ready to compete strongly in the "new" processor field.

Also aiming for that area is a new processor from Inovonics. This eight-band unit, Model 230, claims characteristics which put it very much in line for consideration by station managements looking for a quality lead in this area.

We expect other processors of high quality will be on the floor from Automated Processors, Broadcast Electronics, Neve, Pacific Recorders, Robins, Systems Marketing, Ward-Beck, Wilkinson, Moseley.

Equalizers will also be on hand in great quantity and variety. Shure Brothers will introduce to the NAB their new system which combines an octave-band equalizer with an equalization analyzer. The latter is a separate unit which includes a microphone for pickup, a pink noise generator to produce a test signal, and an octave-band spectrum analyzer.

Reverberation units are plentiful too. A new level of complexity in reverberation will be introduced to NAB by the EMT-250, imported by Gotham Audio of New York, price about $15,000. It uses a computer and 19 separate delay elements for extremely varied reverb and special effects capabilities.

In another processing area, noise reduction, visitors will see the Dolby units developed specifically for

broadcasting and in wide use. Dolby will also show new FM receivers by various manufacturers incorporating noise reduction under Dolby license.

On hand will also be a brand-new rival to Dolby and DBX—the AEG Telefunken C-4 noise reduction system, imported by Gotham Audio, new to NAB, which claims the gaining of 30 dB of dynamic range and other advantages. In its present form, the C-4 is for recording (not for over-the-air) applications and is thus competitive with the Dolby "A" and DBX systems for program production activities.

Digital devices likely to steal limelight

We predicted in last month's report on digital TV that NAB would produce a bumper crop of products utilizing digital techniques. In addition to the digital TBCs that are on display from several manufacturers, two new production switchers will be shown that incorporate digital special effects. These effects were never before available in video and have been seen only through the use of opticals in film production.

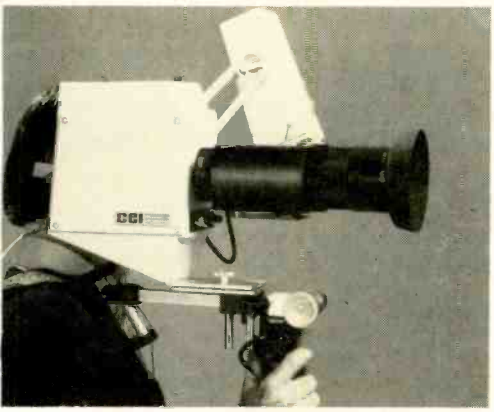
The Grass Valley Group has developed a 1600-7K Switcher with Digital Video Effects by incorporating an NEC FSS-15 frame synchronizer and another device, the DVP-15 Digital Video Processor. The digital devices are interfaced with a Grass Valley 1600 switcher through a special interface unit developed by Grass Valley Group. All of the new effects can be accomplished with the switcher controls. The range of effects that are possible include continuous compression of the image, image expansion, push-on/push-off, flip overs in both the horizontal and vertical planes. Another feature permits the operation of the chroma key mode in such a way that keyed in foreground picture can be tucked, zoomed, or panned while maintaining the proper perspective in the background. Through the use of the frame synchronizer, all effects can be accomplished with non-synchronous signals such as from an ENG remote video source.

Magnifying effect achieved with Grass Valley Digital Video Effects system.

Vital Industries will introduce a thoroughly innovative new product called the Squeezoom®. This device is incorporated into a Vital production switcher with full effects, and will lock up to four non-synchronous, foreign, remote, or in house color video pictures and display them simultaneously on the screen, maintaining the full raster picture content of every signal. The Squeezoom will squeeze a full picture to any size and any position on the screen. It will freeze one full resolution frame of color video, zoom any segment of a picture to full screen, and have multiple horizontal- and vertical-patterns of compression to provide a level of picture control never before possible in video.

Micro Consultants, Inc., which introduced its DFS 3000 Digital Framestore Synchronizer at last year's NAB has had a terrific year with the device and this year, in addition to its TBC, will explore the full range of picture processing and manipulation that they have uncovered in the application of digital techniques.

One of the major benefits of digitalizing the video signal can be noise reduction and as we mentioned last month, Thomson-CSF will exhibit the first Digital Noise Reducer for video. The Noise Reducer makes it possible to process incoming TV signals with mathematical precision. Incoming video is analyzed on a picture element by picture element basis, in real time, and not as a function of the overall picture. Picture improvement is dramatic showing a 12 dB signal-to-noise ratio gain. A marginal 40 dB input color video signal becomes a high quality 52 dB output signal. Overall improvement may be as high



CEI-300 camera in portable mode.

Philips Video 80 in portable mode.

RCA TK760 field/studio unit.

CEI-300 in studio mode.

Hitachi FP1020 one piece ENG camera.

as 15 dB. At low frequencies, such as in cases of streaky chroma noise often present in ¾-in. cassette recorders, the Digital Noise Reducer is extremely effective. The device can have numerous applications wherever video noise reduction is desired. For instance, it could be of great value in ENG situations where low light level conditions existing in the field have produced marginal signal quality. Since no objectionable artifacts are introduced, if high quality video exists, the Digital Noise reducer can be left in the program line at all times.

A new challenge to Plumbicons at NAB

Along with the rise of ENG cameras, a relatively new tube has grown in popularity, the Saticon. A ⅔-in. Saticon has been promoted successfully by its developer, Hitachi Ltd., for several years now. Feature of this tin oxide tube with a selinium junction doped with aresnic and tellurium is its high resolution. Corner response is 40% at 400 TV lines. It has low lag and a balanced spectral response (tubes do not have to be selected depending on color).

These features, plus another, the Saticon's long life characteristics, led RCA to believe it was a logical successor to the lead oxide tube especially for lighter weight cameras.

At NAB, RCA's Electro Optical Devices group will announce a strong commitment to the Saticon. It has signed an agreement with Hitachi and intends to produce these tubes at its Lancaster facility in the near future.

RCA will be showing a tube at NAB designed to its specifications and carrying the designation BC 4908. A one-inch version, the BC 4910, will be along shortly. These first tubes will be produced for RCA by Hitachi but are not interchangeable with Hitachi units.

The RCA ⅔-in Saticon.

Seeing It All At The Convention

There is no simple way to organize your days at NAB to get it all in. Even if your interests are narrow, there is no such thing as a TV area, a radio area, a transmitter area, etc. As our cover this month illustrates, equipment is spread around. The various colors shown—red for TV, orange for radio, blue for RF and green for test and measurement equipment—are in the correct proportions. The Washington Hilton may have the TV biggies such as Ampex, IVC and RCA but in terms of total exhibitors showing TV, it is outranked by both the Shoreham and the Sheraton Park. Radio equipment is mostly found at the Shoreham and the Sheraton Park but not exclusively so. Transmitters are more in evidence at the Sheraton Park but neither of the other locations can be ignored.

In terms of resolution, a ⅔-in. Saticon is superior to a one-inch lead oxide tube, says RCA, and is very close to a 30mm lead oxide tube. Not only is shelf life no problem (the tube does not have to be scanned periodically thus can be readily inventoried) but in terms of operating life, it is similar to the vidicon. The photoconductive surface does not deteriorate so life is determined by that of the cathode. In other respects, RCA feels the Saticon is about at a standoff with the lead oxide types. Prices are comparable.

The Broadcast Systems group at RCA has put this new Saticon in its new TK 760 field/studio camera (to be unveiled at the NAB Convention) and the Electro Optics Devices group feels other camera manufacturers will now opt for the Saticon too. Because of its long life, these tubes also make sense in telecine chains.

The year of the multi-role camera

One basic camera, three different uses—ENG portable, field portable—studio portable—that is the big trend in 1977. Combination cameras are not new—the Hitachi SK-70, first introduced in 1975, could hold claim to be the very first camera covering all of the above categories. A number of units fulfill the dual field-portable/studio roles, such as the IVC 7000P, the RCA TKP-45, the Ampex BCC-3—in fact, most of the one-inch field portables by the aforementioned and Philips, Fernseh, Marconi, etc. could double in the studio. The difference in 1977 is that we are seeing much more modular design. From NAB advance material sent to us, the products of two manufacturers in particular fit this bill: the new CEI-300 series, and the Philips Video 80 line. RCA has taken a slightly different track—using the now proven TK-76 hand held, it has built from it a studio/field camera, the TK-760. The camera is not user convertible from a hand held to a studio type but lenses bought for one camera fit that of the other: more on this camera later.

The trend towards more flexibility comes at just the right time since broadcasters are quite specific in demands for the future. In a survey for Knowledge Industry Reports, consultant Bob Paulson found a marked shift in applications in comparing the present with the future—the shift is from the studio to the field as the lists below show.

Rank Order *Existing Applications*	Rank Order *Future Applications*
1. Local studio programs	1. Field News
2. Studio news*	2. Field local programs
2. Studio spot commercials*	3. Documentaries*
3. Field documentaries	3. Studio News*
4. Field sports	4. Field sports*
5. Field local programs	4. Field spot commercials*
6. Field news	5. Studio rental
7. Studio public access programs	6. Studio public access programs
8. Field spot commercials	7. Studio programs
9. Studio rental	8. Studio spot commercials

*Identical rankings mean applications were tied.

As might be expected, news gathering leads the list of future applications followed by the production of local programs produced in the field. Thus the shift is out of the studio into the field. Note also the increased importance of field spot commercials in the future.

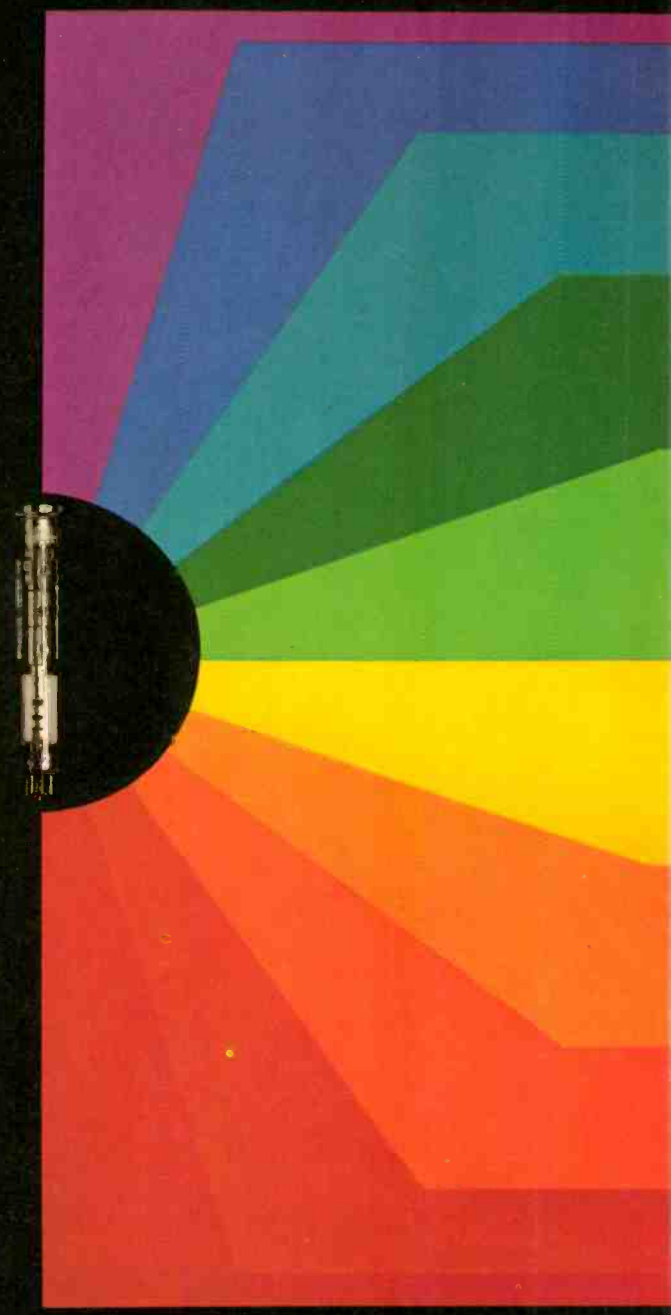
Paulson draws the obvious conclusion: The ENG Revolution Has Started Others! He adds, "All of these

continued on page 97

Now from RCA...

SATICON®*

The 2/3" broadcast vidicon that can make small cameras better, big cameras smaller.



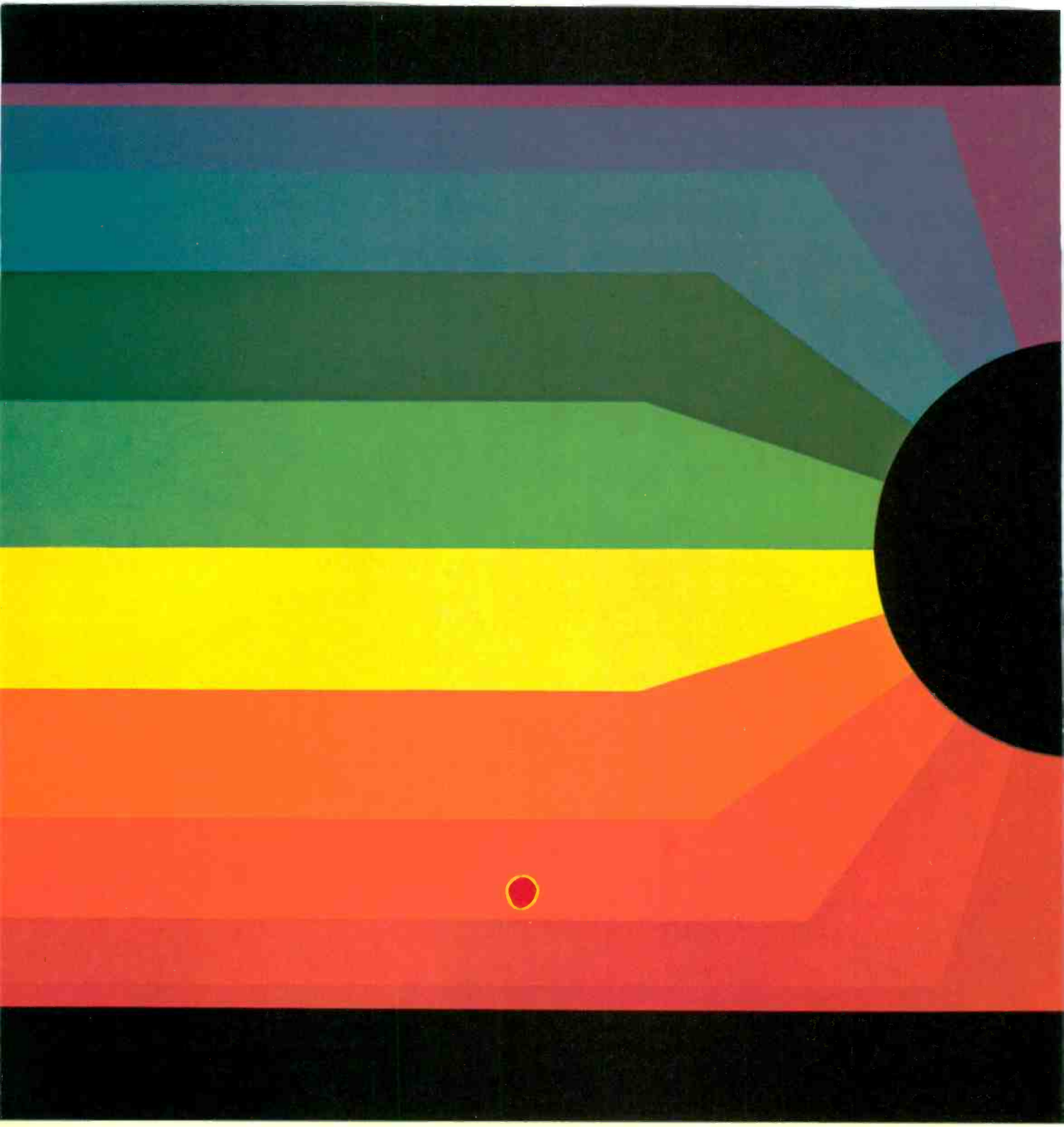
SATICON. It could very well be the broadcast color tube of the future. Only 2/3" in diameter. Yet it packs picture quality equal to any 1" type, with resolution rivaling all 30 mm lead oxide vidicons—including our own. It also has very low dark current. Very low lag when used with bias light. All of which makes the SATICON tube a superb choice for hand-held ENG cameras and compact studio cameras.

What's more, the SATICON tube is ready for work—without aging. And you can be certain of excellent tube-to-tube uniformity. A very stable photoconductor. Projected long life—in the camera or on the shelf.

The 2/3" SATICON tube is available now. And for telecine there is a 1" version.

SATICON is only one in a brand-new RCA series of vidicons specially tailored to the needs of broadcasters. Check them out on the next two pages...

*Used by permission of trademark owner.



Now, just about every camera you own—live or film—can deliver better pictures. More predictable service. From the moment you plug in a CAMERA READY tube. Why?

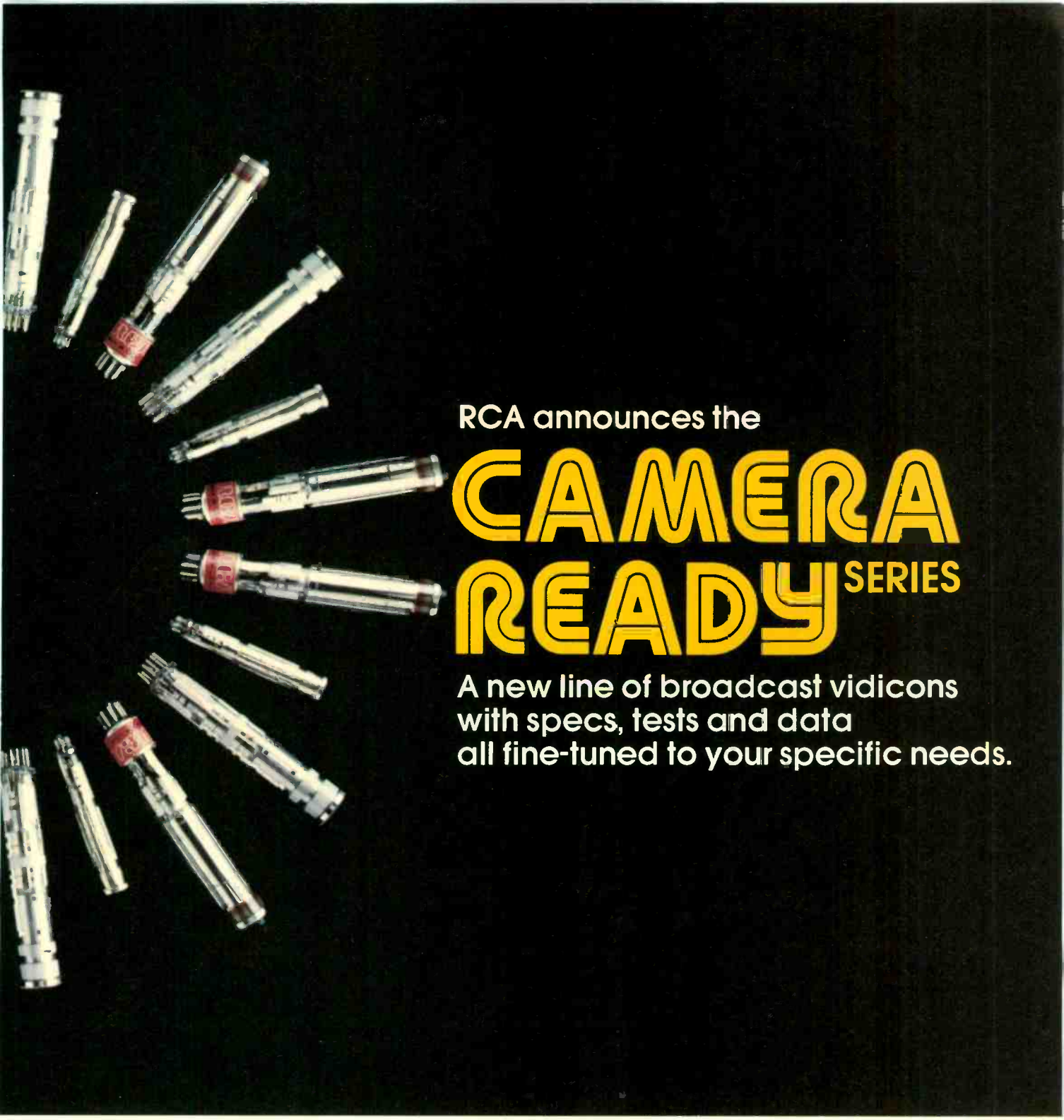
Because these are no ordinary tubes. They're 16 vidicon types precisely matched to broadcast cameras. Broadcast needs. A perfect marriage of traditional RCA quality and a new set of criteria—with strict limits on such factors as amplitude response, lag, image retention, dark current and blemish criteria.

Tubes for virtually any broadcast use. All marked "BC."

The CAMERA READY line consists of: *Sulfide* (antimony trisulfide) vidicons for color film service. *S-T* (silicon - target) vidicons, with greater sensitivity and spectral range. *Vistacon* (lead oxide) vidicons for live color. And the new *SATICON*®* (selenium arsenic tellurium) vidicons for compact hand-held or small studio cameras, and telecine. What makes these tubes so special?

Two kinds of testing.

We test all tubes electrically under simulated end-use conditions—and that includes subjecting each tube to the typical range of lighting condi-



RCA announces the

CAMERA READY SERIES

A new line of broadcast vidicons with specs, tests and data all fine-tuned to your specific needs.

tions it will encounter in actual operation. Then, on a sample basis, we test *in a broadcast camera*. Under actual broadcast conditions. Both of these tests help ensure reliable picture quality.

With every tube a test data card.

When you get a CAMERA READY tube you know exactly what it will do. Because you know what it's already done. Every important test, every important performance characteristic is right there on a data card that comes with the tube.

Easy-to-use RCA CAMERA READY tubes are also easy to get. They're available locally through your RCA distributor. And if you need application help, call on our field sales force.

Contact RCA BC Tube Marketing Manager, New Holland Avenue, Lancaster, PA 17604. Or call (717) 397-7661.

*Used by permission of trademark owner.

RCA

Circle 162 on Reader Service Card

Our broadcast consoles get around.

Mexico City. Nashville. San Juan. New York. Tampa. Brazil. Albuquerque. Fort Worth. Haiti. Japan. Tacoma.

All over the world broadcast engineers are finding that ADM® broadcast consoles have the advanced performance and engineering they require. And for good reason . . . our specifications are the finest in the industry!

Expressly designed for broadcasting, ADM full-featured consoles provide complete flexibility through plug-in modular components. And human engineering supplies ease of operation through functional lay-out of controls.

For individual broadcaster's needs, ADM custom-engineers consoles to customer specifications.

All ADM consoles are ruggedly built. Or we wouldn't back them with the strongest warranty in the business—an exclusive 5-year warranty.

No wonder ADM consoles take a lot of exotic trips.

The sound heard 'round the world.

See us at the Hilton Booth 431

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

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

Circle 163 on Reader Service Card

activities require equipment which is not only portable and reliable, but *especially*, easy to operate by creative photographer/writer/director types, *not* operating technicians. To meet operating needs of these varied field production activities, cameras are required that can either be battery-operated self-contained on a shoulder mount, or tripod- or shoulder-mounted but operated from a distant CCU as part of a system. Also needed are interchangeable zoom and fixed focus lenses, viewfinders to match the job, and tally and intercom circuitry."

Paulson goes on to predict that the new portable equipment used in the field will also go indoors, particularly in the news studio. He foresees TV stations reporting local news five minutes on the hour, just like radio. But news will not be televised on the typical studio camera manned with a crew of six or more. Rather cameras will "be totally automatic, mounted off the floor, and fully remote controlled from the on-air, on-camera 'Editor's Desk'."

The Knowledge Industry survey, conducted by Paulson, pinpointed what camera features are important. See Table I. From this we can conclude that camera manufacturers are a savvy bunch indeed, since the modular approach taken by CEI, Philips and others offers options in viewfinder size, remote control features, etc. Some of the CEI features follow. How the features of the Philips Video 80 line, which includes switchers, fit into this pattern can be inferred by reading the box, "Video 80—Philips Flexible Answer To Broadcasters Needs."

Feature	Very Important	Moderately Important	Not Important
Size/weight	66%	34%	0%
Interchangeable fixed/zoom lens complement	63	13	24
"Automatic" lineup	55	32	13
Viewfinder size	53	39	8
Remote "Painting" controls	53	26	21
Studio/Portable convertible	39	26	35
One-piece	37	45	18
Included mic channel	16	31	53

Table 1. Broadcast station engineering managers' ratings of camera features as determined by Knowledge Industry Publications.

The modular approach taken by CEI makes the CEI-300 extremely flexible. Some six major configurations are depicted in a bulletin that will be distributed at NAB—each configuration offering broadcast quality. These range from a hand held portable with studio capability to a studio camera with portable capability. CEI starts with two head configurations—one for ⅔ in. Saticons or Plumbicons, a second for 1 in. Plumbicons. There is a choice of a 3 in. ocular or direct viewfinder for portable configurations and a big 8 in. studio viewfinder (which tilts and rotates). The head uses a one-piece sealed prism optical assembly. The separate electronic unit can be operated up to 400 feet away from the head—or it can be attached to the head for pedestal mounting. Quick disconnect mounts are used throughout for rapid reconfiguration from studio to portable operation and vice versa. It takes only a few minutes to switch from one configuration to another. There is a wide choice of lenses and support equipment. There is a systems integration unit that gen locks with automatic pulse advance and allows remote system operation up to 2500 feet. This SIU includes iris and pedestal joystick, centering color trim controls, and other features. The electronic unit reflects the latest technology and all of the features one might want in a camera—full I and Q encoder with color bar generators, two line V/H image enhancement with coring and combining auto white balance, automatic and manual iris control, video level indicator in viewfinder, shading and flare correction, variable gains (to 12 dB), test pulse for set up, modulated registration to optimize all zones, luminance black stretch, etc.

Prices for the CEI-300 system are in the range of $25,000 to $40,000.

We don't have details but Ikegami reports that they will be displaying, for the first time, an HK-357 one-inch Plumbicon studio and field camera—which uses Triaxal cable. We do not know whether or not this is a "convertible" unit.

The TK-760 is RCA's answer to the need for a studio type camera capable of doing studio/field jobs relatively inexpensively and easily. The new TK-760 has a secret weapon; it's a new RCA specified ⅔-inch Saticon—a new tube which RCA will, sometime in the future, be producing in its own plant. The new camera will be priced under $50,000.

The TK-760 studio camera has a five-inch diagonal

continued on page 100

Some Convention Highlights And Featured Speakers

A joint TV-radio management session with the title "Broadcasting's Confrontation with the 1st Amendment" will have as keynote speaker, Eric Severeid of CBS, and a panel for questions, answers, discussion consisting of Senator William Proxmire, FCC Commissioner Abbott Washburn, former Senator John Pastore, and former FCC Commissioner Nicholas Johnson.

A session with another provocative title, "Television's Golden Age: Yesterday, Today, or Tomorrow?" will be moderated by Allan Ludden and will have as panelists, Fred Silverman of ABC and Grant Tinker, MGM.

There will be an open panel session for TV management, with five former FCC Commissioners on stage. TV workshops will take up, among other subjects, Equal Employment Opportunity rules; children's programming; cable TV; how to read TV ratings; how to work with community groups.

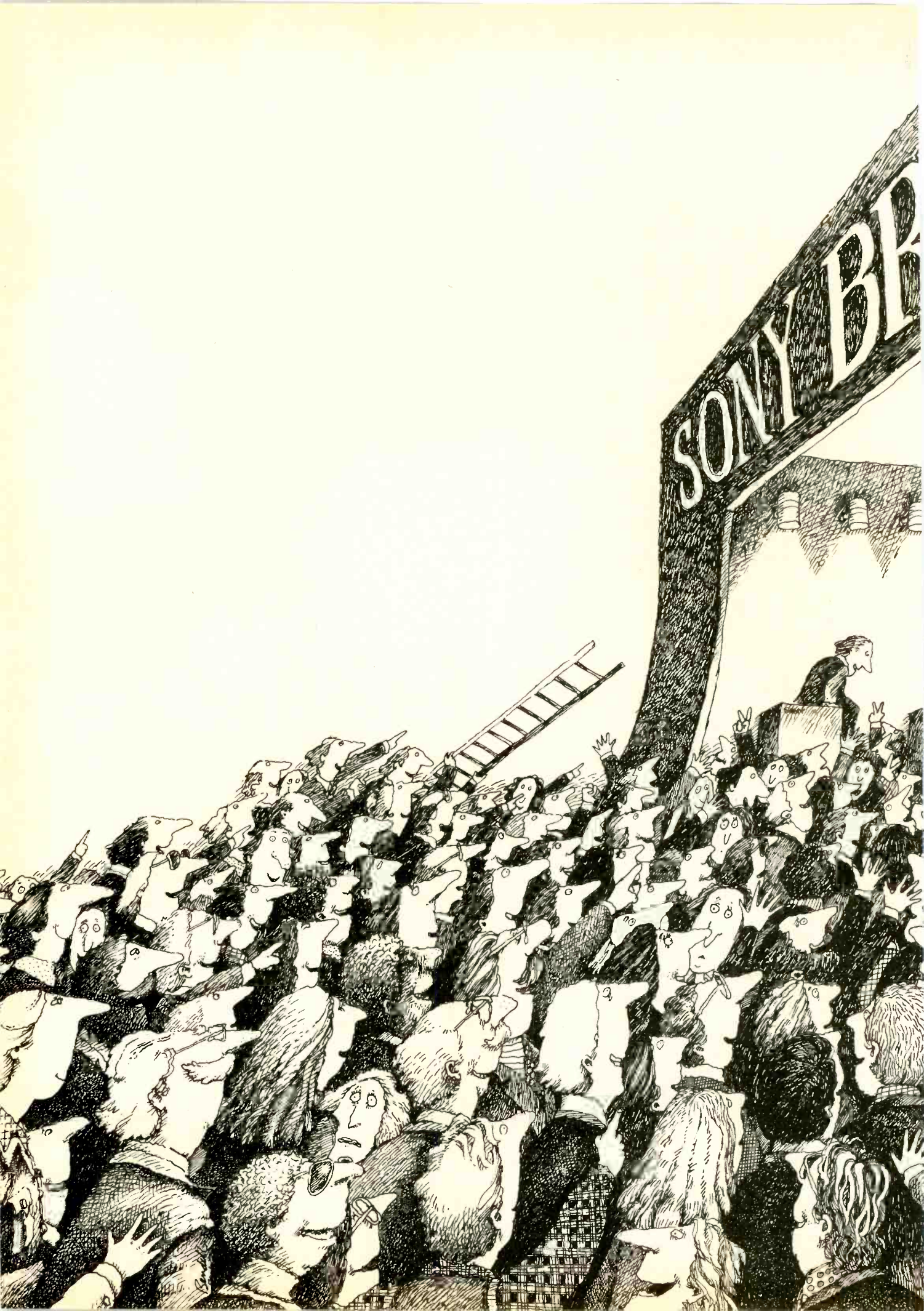
On the radio side, there will be a preview of this year's NAB Radio Month. There will be a question-and-answer session with, on stage, FCC Chairman Wiley, Dick Shiben, Chief of Renewals, Wallace Johnson, Chief of the Broadcast Bureau, William Putney, Deputy Chief, and Morton Levy, Chief of the Facilities Division.

The radio workshops will cover, among other topics, ratings and will include an advance summary of the major NAB study, "The Future of Radio," presented by John Dimling, NAB vice president for research.

Technical sessions will include the usual papers on technical advances, the dialogue with the FCC and four very topical morning workshops: Mon., Audio Processing; Tues., AM stereo, and ENG Labor Relations; Wed., SMPTE special.

Two of the luncheons will have as featured speakers, respectively, Senator Ernest Hollings, and Representative Lionel Van Deerlin.

The possibility of an appearance by President Carter was apparently still just that at press time.


SONY BE

If you think you had problems getting into our booth last year, wait until this year.

You remember.

The Sony Broadcast booth, at last year's NAB Show. Where we proved our commitment to the broadcast industry. And the broadcast industry proved how many people could be crushed into sixteen hundred feet of exhibit space.

This year, things are going to be different.

They're going to be worse.

We're showing even more. Which will attract even bigger crowds. Because of space limitations at the show, we couldn't build a bigger booth. But if you're tough enough to push through the mob, what you see will make you forget those elbows in your ribs.

We can't give all our secrets away. We can, however, let you in on a few of the reasons why Sony Broadcast is going to make such an impact.

1. We'll have the production version of our new 1" high band video recorder, the BVH-1000. Last year, we introduced this model in prototype; this year we've added a lot more features to the production version. And our BVH-1000 is still the most outstanding development on the broadcast scene.

2. You might also be interested in seeing the BVH-1000's little sister. A fully compatible, battery operated, portable 1" high band video recorder for professional production in the field.

3. Camera buffs will see some eye-openers, too. We plan to exhibit two new color cameras in addition to our current field production BVP-100. What makes the Sony Broadcast approach unique is that all three of our cameras utilize different technologies. So broadcasters can work within different budgets.

4. If the use of SMPTE code hasn't been flexible enough to suit you, check out the Sony Broadcast breakthrough in this area. It's something really new.

5. And, of course, we plan to hang onto our preeminent position in the world of electronic news gathering. If you're into EJ, ENG, or EFP, you're into Sony Broadcast. And we've got some very, very exciting things to show you.

That's all we can reveal for now. At the Sony Broadcast booth in the Shoreham Hotel on March 27-30, we'll give you the whole story.

If you have to fight your way in, we apologize.

But that's the price we pay for being where the action is.

Sony Broadcast

Sony Corporation of America, 9 West 57 Street, New York, New York 10019

Circle 164 on Reader Service Card for literature
Circle 165 on Reader Service Card for a demonstration

tilting viewfinder providing for easy viewing by the camera operator. Brightness, contrast and high-peaking controls are conveniently located on the front panel.

The TK-760 can be operated as a completely self-contained camera without a separate camera control unit, with AC power fed directly to the camera through a power cord, and video output carried by a coaxial cable. Push button switches located at the rear of the camera provide control for "M" luminance, red, green, blue, and external video.

When remote control of operational control functions is desired, a small CCU is used (7 × 10 inches in size). The unit, connected to the camera head through a 45-conductor camera cable, provides for control of iris, black level, and R&B white balance. Push button switches are provided for bars, auto white, auto white balance, tally call, high sensitivity, auto iris, and power. A single two-way interphone is also provided in the CCU. A chroma key accessory, which becomes an integral part of the camera when installed, also is available as an option.

The TK-760 will be available to operate on NTSC, PAL-B, PAL-M and SECAM television standards. Another feature is automatic cable equalization—the equalization even compensates for cable changes as a result of temperature variation, degradation or whatever.

The TK-760 is completely weather proof and completely RFI shielded. It has an unusual new lens (produced by Fujinon), a 14 × 10 f/1.9 lens with a built in 2X extender. The entire camera weighs 45 lbs. complete. It's a total system, says RCA.

There will be some strictly new ENG type cameras on hand. Ikegami reports it will surprise us with an HL-51 one-inch portable camera using Triaxial cable. Hitachi is showing a completely new portable, the FP-1020. The FP-1020 is a 3-tube compact self-contained camera weighing less than 16 pounds. It utilizes the ever more popular Saticon tube for increased resolution and uniform sensitivity. Power consumption is only 22 watts.

Set up of auto white and black balance is through digital memory. The FP-1020 will sell for less than $20,000.

Asaca says it will have a new single head (no back pack) attractively-priced portable TV camera on hand and JVC promises a new hand held ENG color camera. GBC-TV Corp. will be showing a Chalnicon-equipped single head camera with a 1½ inch viewfinder that will be priced under $20,000, we hear. This camera is built by Toshiba.

Plenty of camera accessories

There will be plenty to choose from in terms of lenses for cameras—either portable or studio versions. Rank has come up with a concept to make buying easier. It has a new Varotal Multi-Role (MRL) lens which, for the first time, gives the broadcaster a common set of optical zoom lens modules for use with either a portable camera or a studio camera. Lens change instantaneously with no need for re-registration or camera adjustment. For more details, see the box, "Rank's New Multi-Role Lens Extends Optical Flexibility."

Angenieux reports several new products: a 42X continuous telephoto zoom lens for field applications and a 42X continuous wide angle zoom for studio use. Angenieux will have some system accessories for the 15 × 19.5 total lens system for ENG cameras.

Ampex's Electronic Still Store system.

In terms of new lenses, Fujinon Optical says it will have a new field lens for sports coverage (the 30 × 20 ESM) which covers more focal lengths than other lenses in the 20 to 124mm class. Fujinon will also have a 14 × 10 fl.9 lens for ENG cameras with a built-in 2X extender.

Tele-Cine reports several new lenses: a 30:1 field lens (33-1000mm) for 1¼ in. tubes, a 26-800mm for 1 in. tubes, and a 10X (10-100mm) ENG lens for ⅔ in. formats.

Canon says it will feature faster lenses to conserve lighting. A new product will be the PV25X20B 25 to 1 zoom rated fl.8-3.0.

Just as more and more lenses are being designed to complement advances in ENG cameras, so are new tripods, pedestals, etc. being developed. Listec will show the PortaPed which combines features of studio mounting with that necessary for the out of doors. The PortaPed collapses for easy carrying and is lightweight but when set up it functions as a smooth pnuematic counterbalance and incorporates a leveling device. Listec will also show a new fluid head with smooth and variable torque as well as smooth, adjustable friction pan and tilt movement.

Innovative Television Equipment will show a new tripod (ITE-T2) and hydro head (ITE-H9) for ENG cameras.

Cinema Products will be back with its remarkable Steadicam. The latest stabilizing system is known as the "Universal Model." It works interchangeably with either 16mm or 35mm motion picture cameras and hand held video cameras.

Power Optics will show a device we described in our November report of the IBC, London convention. Called Scene-Synch, the scheme allows the camera to pan and tilt using chromakey techniques.

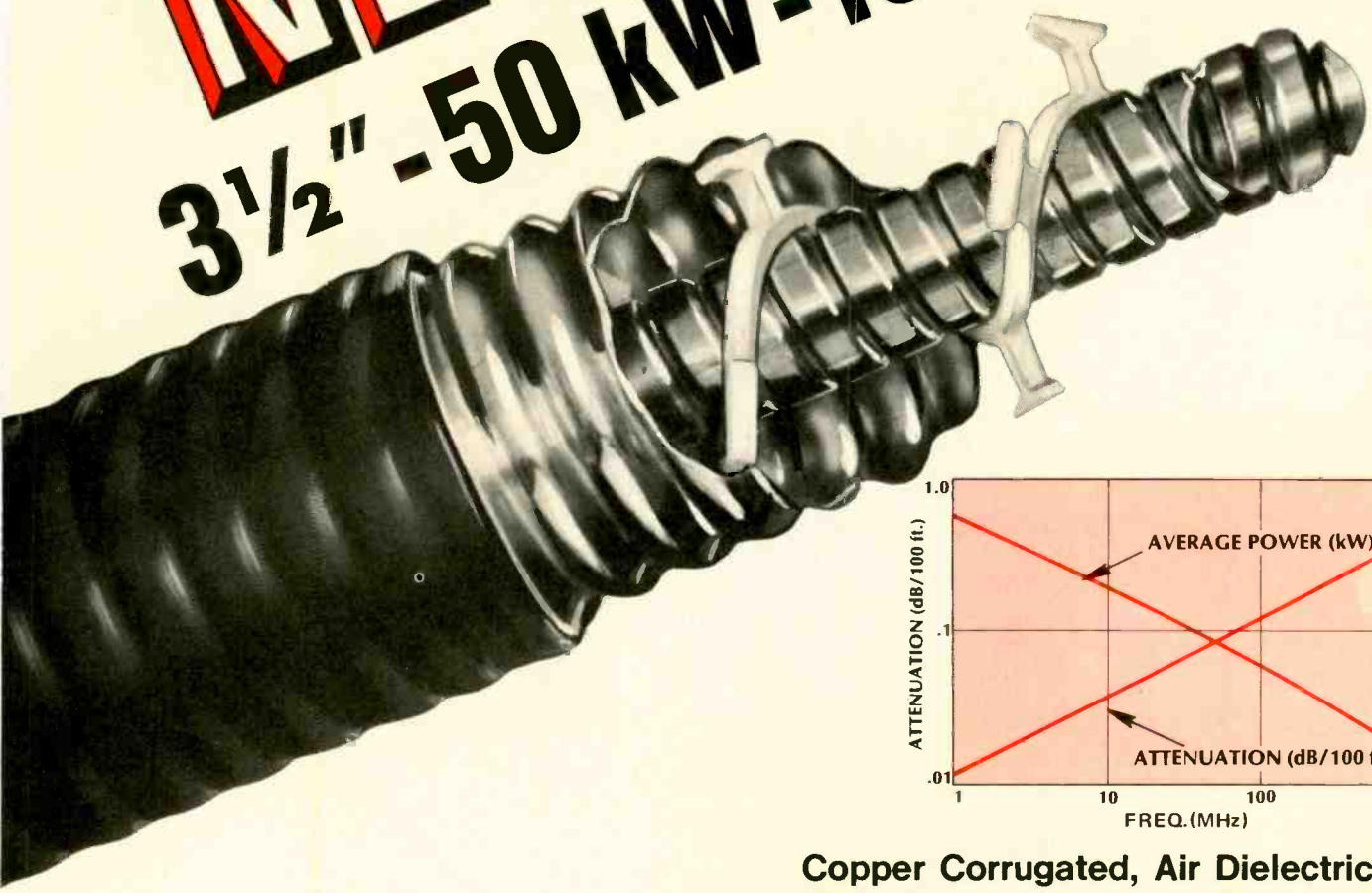
VTRs: focus will be on one-inchers

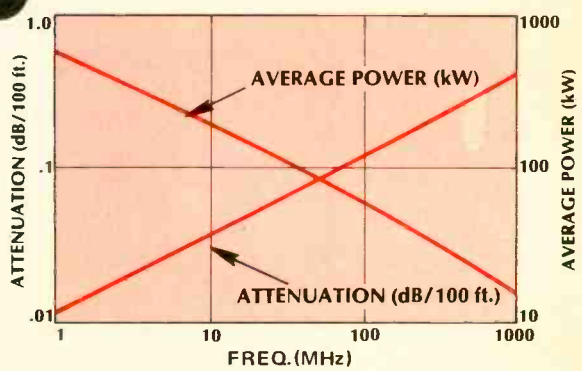
It seems safe to predict that there will be no new quadruplex machines introduced this year at NAB. Ampex and RCA will be showing their full line but those who are talking most about quad are the rebuilders. A.F. Associates, Northvale, NJ, for example, will show up with some Ampex 1200s repackaged with CVS 520 TBCs. These units are low in weight (under 500 lbs.). Merlin Engineering will be back with quad rebuilds and a new quad duplication system. The chief interest this year will be in portables. The one-inchers will be in the limelight.

continued on page 104

NEW coaxial cable

3½" - 50 kW - 100 MHz





Copper Corrugated, Air Dielectric for High Power – Low Loss Applications, Specifically – FM Broadcasting and AM, VHF/UHF TV Antenna Feeders

This 3½" air dielectric Wellflex consists of a corrugated tubular copper center conductor, unique polyethylene locked vertebrae helix dielectric, copper corrugated outer conductor and black polyethylene jacket. It is remarkably flexible, has excellent mechanical stability and extremely low attenuation.

SPECIFICATIONS:

Velocity of Propagation	**96%**
Attenuation at 100 MHz	**0.110 dB/100 ft.**
Average Power at 100 MHz	**50.06 kW**
Peak Power	**940 kW**

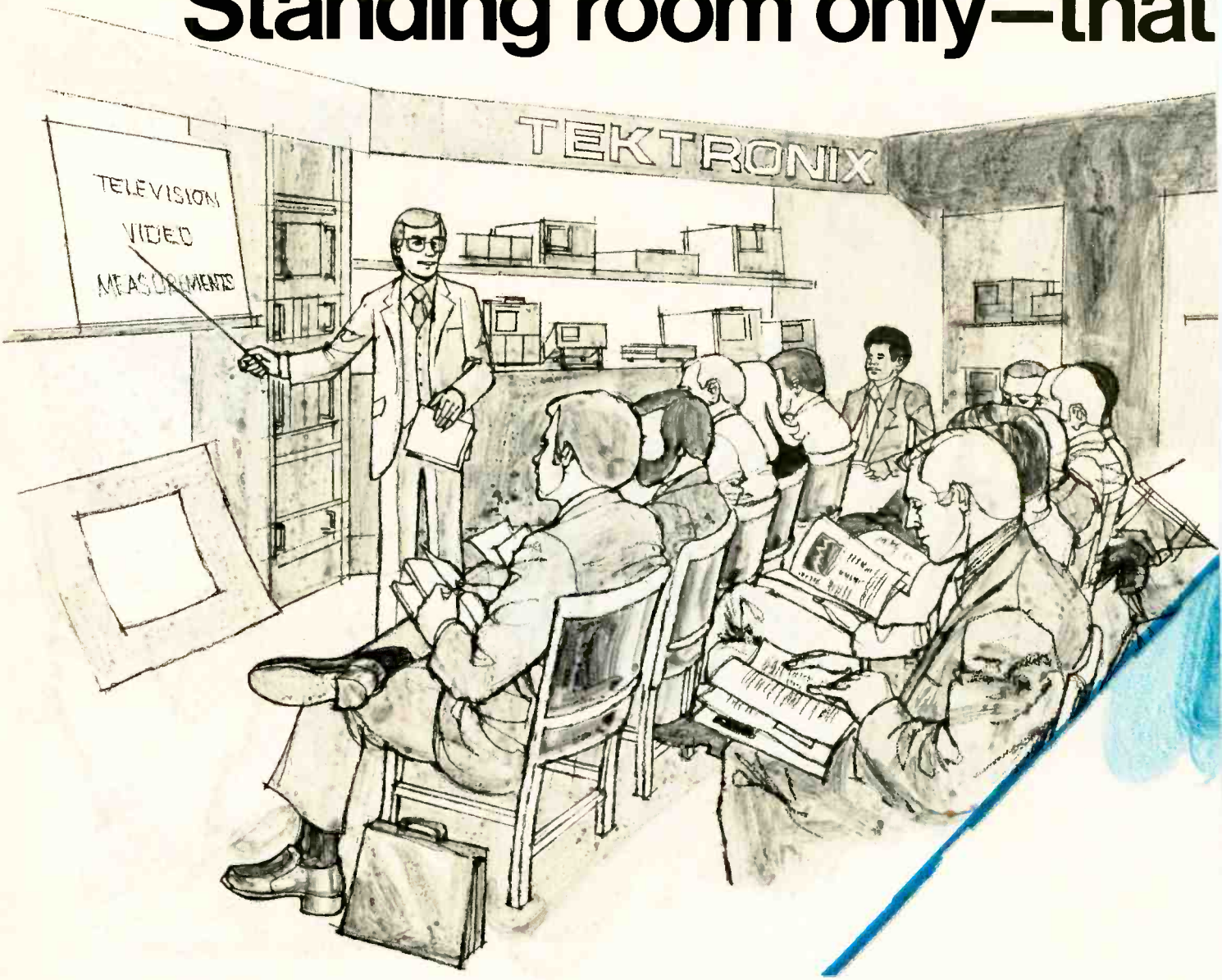
Send for our new 3½" Coax Data Sheet and our complete catalog.

Cablewave Systems

Cablewave Systems Inc.
60 Dodge Avenue, North Haven, Connecticut 06473
203-239-3311 • TWX: 710-465-0244

Circle 166 on Reader Service Card

Standing room only—that



The Tektronix Measurement Theater will be back at NAB-77, bigger and better

If your job gets you into Audio, Video or RF, you'll want to be there.

Inside the Theater you'll see scheduled presentations of the latest, most effective operational measurements for AM, FM and television.

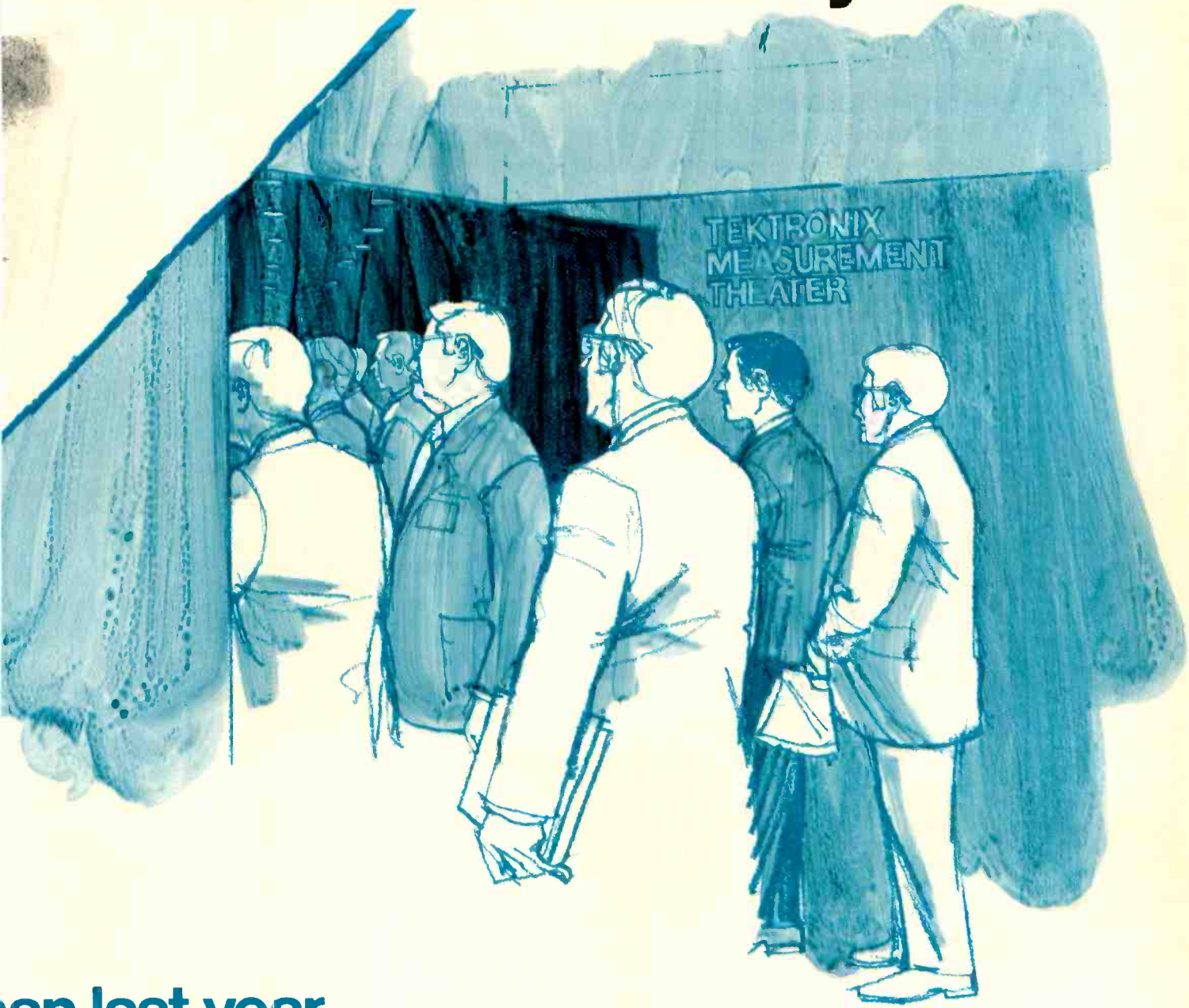
And throughout the Tektronix exhibit we'll have new products for AM, FM and television operations.

Presentations in the Measurement Theater will be "how-to" sessions—they'll give you practical facts to put to use on the job. Basic elements of each presentation will be proof-of-performance procedures, monitoring requirements and day-to-day maintenance requirements.

Tek field engineers will be

Visit the Tektronix Measu

vas the situation last year



an last year

on hand to answer questions and offer individual demonstrations of products best geared to your needs.

Measurement Theater Program

Video Operational Measurements
Two Sessions Daily*

TV RF Operational Measurements
Two Sessions Daily*

AM/FM/Audio Measurements
Two Sessions Daily*

Taped Portions of Transmission Measurements Seminar
Several Times Daily*

*Pick up a program schedule at Booth 214, Sheraton Park Exhibit Hall

Tektronix®
COMMITTED TO EXCELLENCE

Circle 167 on Reader Service Card

ement Theater at NAB-77

As mentioned in the report on the SMPTE Winter Television Conference elsewhere in this issue, there will be a new item in the BCN format. Both Bosch Fernseh, the originator of the BCN format, and IVC will have new portables on display. Bosch Ferseh's unit has new insert and assembly edit capabilities, but it is essentially the stacked reel version shown last year. IVC will have pilot models of a 45 lb. BCN portable that has both reels on

continued on page 106

Video 80—Philips Flexible Answer to Broadcasters Needs

Video 80 is four cameras and four systems, for three different broadcast needs.

1. Adaptable portable cameras for field production;
2. Automatic cameras for add-on to existing studio and field production systems;
3. Multi-camera systems for new applications.

Philips Video 80 provides modular camera and modular system solutions to each of the above needs. Under development since 1973, Video 80 reflects a new concept in camera functional design and performance built around ⅔ inch tubes. The four configurations (available in NTSC, PAL-B, PAL-M and SECAM versions) are the one-piece ENG, two-piece portable EFP, studio, and telecine/special cameras.

Video 80 also reflects a four-way systems approach adopting to portable, transportable, mobile and studio uses. Accessory video and audio components integrate Video 80 cameras into complete systems which can be assembled, lined up and operated without the aid of TV test equipment, tools or technicians. All units include provisions for plugging in components that will permit remote or automatic control of the cameras.

The head is the cornerstone of the Philips modular approach. It is extremely rugged, miniaturized, and RFI shielded. The RGB prism block mounts to two precisely machined reference planes which are part of the lens mounting subassembly. Yoke sets, computer matched for optimum registration, precision-mount to the prism block. They are vernier-adjustable for back focus and rotation alignment.

The Video 80 camera will accept currently available ⅔ inch, all-magnetic tubes including Saticons,™ Newvicons,™ Chalnicons,™ as well as Plumbicons™.

Electronics in the head include three low-noise FET pre-amps concentrically mounted adjacent to the tube faces with an S/N specification of 49 dB minimum, test sawtooth generator, focus wobble, scan failure protection and dark current/flare correction. A DC to DC voltage converter and sensor/regulator maintain camera performance 'on spec' in the face of environment variables and cable lengths. Cables can be connected and disconnected with the power on.

Externally, the Video 80 head interfaces to four associated components: 1. A quick-change bayonet mount permits rapid installation of either studio or field lenses, fixed focal length lens adapter and lens accessories including 1.5X and 2.0X range extenders (which can be combined to provide up to 4.0X range extension) and four medical special applications mounts. 2. A click-lock slide track accepts any of three plug-in viewfinders for studio, EFP and ENG configurations. A versatile battery-powered ENG Electronic Pack (EP) including a gen-lock color sync generator, fully automatic signal processor and encoder shares the track space with the ENG viewfinder. 3. A patented Quick-on™ base plate mounting adapter permits its mounting on any standard tripod or mount (in seconds). 4. A quick-disconnect camera cable connector reduces system assembly time to seconds.

Video 80 system in one piece configuration, above, and studio configuration, right.

The Video 80 system has three interchangeable camera control units. In addition to the ENG Electronics Pack, two versatile Camera Remote Control Units (CRCUs) are provided for studio and field operation of the head either as a standalone camera or as part of a multi-camera system.

A rack-mountable *triple* CRCU/switcher/test set contains a gen-lock color sync generator, three camera controllers, a four-input vertical interval switcher and Philips' proprietary VLS (Video Line Sampling) and CLUE (Color Line Up Equipment) camera lineup circuits. These are wired to a test and alignment RGB switcher to allow precise color matching of three cameras. A non-technical operator can perform a complete camera set up and alignment job in minutes, using only a balck and white monitor, without any other test equipment or tweaking tools. A *single* CRCU has the same alignment and operational features, plus separate R, G and B as well as composite video outputs.

Horizontal contours out of Green are provided in all control unit configurations. Vertical contours are also standard, with the circuit location depending on system configuration. Standard cables of 1.5, 15, 30 and 50 meters (163 feet) are available to interconnect camera heads and CRCUs.

One-piece ENG configuration. The self-contained version in the family is the "Video 80 1-piece ENG Portable Camera." It weighs 18 pounds including 1½-inch electronic viewfinder with eyepiece. Electronic Pack, portable control handle, system interface connector, and reporter's microphone with 10 meter cable. A 6:1 lens adds 2 pounds, a 10:1 lens adds 3 pounds. The battery belt is a separate item.

In addition to automatic white balance and iris control now commonly found in all ENG cameras, the Electronic Pack's full complement of *automatic* parameter sensing and correction circuits includes black balance, dark desaturation, centering, level-dependent gamma, and extra video gain coupled with bandwidth limiting. Image enhancement is two-line vertical out of Green, level dependent, with coring and comb filtering.

The Electronic Pack includes a gen-lock color sync generator with stability meeting FCC specs for broadcasting. Outputs include color composite video, color bars, monochrome video for maintenance and alignment, and R, G, B or B-Y for chroma key setups. It may be located up to 10 meters away from the head.

These automatics guarantee the Video 80 ENG camera will deliver a crisp, color-corrected, noise-suppressed picture at light levels from 4 footcandles (40 lux) to bright daylight, at color temperatures from 2,000 to 10,000°K without need for color filters.

Two piece EFP configuration. This version provides control over camera performance at a remote control location, as needed in electronic field produc-

Video 80 continued on page 106

When WBAC buys AMPRO, they *broadcast* it . . .

Bill Thomason,
President
WBAC,
Cleveland, Tennessee

and, according to Bill Thomason, President of WBAC . . . "our reason for choosing an Ampro console was its versatility and the unique craftsmanship that went into the makeup of this fine piece of equipment. WBAC has been in the broadcasting business for 32 years and our format and needs have grown. We were impressed by the many functions of our eight channel dual mono Ampro. For this reason, we decided to try Ampro's cartridge decks and, to our satisfaction, we have not had to do any type of maintenance other than routine head cleaning for over a year."

Ampro is the choice of the professional broadcaster. Their complete line of 6, 8, 10 and 12 channel audio consoles — stereo, mono, dual mono and stereo or simulcast — as well as cartridge equipment and turntable pre-amps are backed up by a 24 hour staff of engineers seven days a week. All Ampro equipment features superior RF shielding . . . never a spurious pick-up problem no matter XMTR proximity. All equipment is logically laid-out for easy operation, constructed by craftsmen using the highest quality components. And, most important, Ampro equipment is made to last and last.

Find out how you can BROADCAST it . . . call your Ampro representative or the factory today.

AMPRO CORPORATION
850 PENNSYLVANIA BLVD., FEASTERVILLE, PA 19047 • (215) 322-5100

Circle 168 on Reader Service Card

SEE US AT NAB • 300 A • SHERATON PARK

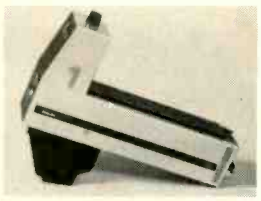
the same plane. This means threading is easier and tape handling gentler. IVC's unit, identified as the 8020 recorder, will record for one hour on a self-contained 80-minute battery.

IVC has designed an 8025 interface accessory so that full broadcast playback is possible directly from the 8020

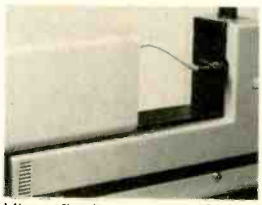
continued on page 108

Video 80 continued

Quick change bayonnet mount.



Basic universal head module.



View finder and ENG Electronic pack slides onto head.

Quick-on base plate mounting adapter.

tion. The camera unit less lens, weighs 14 lbs., including 4½ inch reflex viewfinder and portable control handle.

This camera configuration and either a single or triple CRCU make up a complete standalone camera system to feed a VTR, program video/audio lines, or microwave transmitter. The CRCU internal crystal-controlled sync generator is temperature-stabilized to maintain subcarrier frequency at 3.58 MHz reference ±1 Hz, well within FCC broadcast specifications.

The sync generator automatically locks to and tracks *any* reference color composite, black burst or monochrome 2:1 interface video signal connected to it. "Any" includes broadcast station sync, hardwired or from a receiver, of course, with gen-lock tracking maintained within ±1.5 degrees of reference. It also includes lesser quality sync such as a jittering, industrial sync encountered in non-time base corrected, non-phased playback from a battery-powered portable VTR.

A unique two-chip sync generator design with separate ICs for pulse generation and subcarrier lock is used to achieve this gen-lock capability.

Another CRCU feature is cable-length-independent sync timing. Cables can be changed from 1.5 to 50 meters to accommodate changing production setup requirements without re-timing sync or adjusting burst phase at the CRCU.

The CRCUs have setup and "Painting" controls grouped for easy adjustment by a non-technical "video shader." The master BLACK LEVEL pot controls pedestal. Three individual R, G, and B BLACK LEVEL pots are used principally during camera setup. Push-buttons superimpose the VLS* signal waveform display on the black and white preview monitor. R, G, and B buttons operate with the CLUE* selector to feed one or more tube channel outputs to the monitor during color balancing.

Green 6-dB and Red and Blue 12-dB extra gain switches are under a hinged cover, along with setup and alignment controls, color bars, text sawtooth/standby, liner matrix and viewfinder feed.

Studio Camera Configuration. A 4½ inch direct viewfinder and 10:1, f/1.8 power focus/power zoom lens are the standard components in the Video 80 studio camera. A specially designed tripod, dolly, and cradle head with pan bar and lens control handle are provided as an integrated accessory, but the Quick-Om adapter permits easy and quick camera setup on any cradle head or mount.

Telecine configuration. Unique to Video 80 is the adaptability of its head to become a telecine camera. A remote control panel provided with the telecine optical multiplexer controls guillotine mirror positioning, initiates cuts and dissolves of the projectors, and starts and stops film projectors.

Extreme convertability—multiple-camera production setups

Conversion of the camera from one configuration to any other takes less than 30 seconds.

A standalone portable system bought originally for either EFP or ENG use may economically be expanded for the other field application, or for part-time use in the studio as a backup camera. Cameras bought for telecine and studio use can be borrowed for field operations. For none of these conversions is it necessary to call on a skilled maintenance technician for setup or alignment help.

The Video 80 system boasts of many video and production accessories. Among these are the Video Production Switcher and Television Audio Production Mixer. Combined with the triple CRCU, these accessories can be assembled into an almost infinite array of *transportable, mobile* systems—supermarket shopping cart, motorcycle side car, golf cart, station wagon, van—or *studio* multi-camera systems.

The 6-input plus black Video Production Switcher mates with the triple CRCU via a single 10-meter multi-core cable. Its video signal processing facilities are available on the four interchangeable buses (A, B, Preview, Effects). Special effects and picture processing capabilities include separate Horizontal and Vertical wipes to provide corner inserts, external SEG input and three-level background/foreground chroma key. A black and white titling camera (included with the system) keys in white lettering with horizontal black contours from black on white graphics. If the selected input has non-synchronous sync or non-phased chroma, gen-lock is achieved in seconds as Video 80 sync and subcarrier "float" to the selected input. Following lockup, all switcher functions combining that input and the three camera pictures can be called up without a "glitch."

The Video 80 Television Audio Production Mixer has nine input channels which can be assigned to output buses, A, B, or A and B. This no-glitch capability for routing audio to either VTR audio channel can be employed to reduce post-production audio editing problems to single-system dimensions but with double-system flexibility.

Regardless of the combination of Video 80 products assembled in a system, interconnections for program audio, intercom, camera tally and power distribution are automatically included. All Video 80 system interfaces and interconnecting cables also contain extra circuits for adding new automation concepts such as remote pan and tilt control. Prices start at around $15,000 for basic single camera systems. A fully equipped transportable three-camera production system can be assembled and turned on for less than $75,000.

*VLS is the video line sampling technique by which an amplitude display of a variable number of H lines in the video signal can be superimposed on a monitor, eliminating the normal waveform monitor requirement.

**CLUE is the camera lineup technique in which the amplitudes of R-G-B signals at the color encoder input are sequentially combined for comparison on a monochrome picture monitor display, and corrected visually by equalizing sample brightness, which thereby provides precise color balance.

WKLS, Atlanta, broadcasts 100% disc-to-air. That's why it uses Stanton's 681 series... exclusively.

Bob Helbush, Chief Engineer, making a quality control check using a 681 cartridge.

Top notch broadcasters who capture a large share of the listening audience, are critically aware of the necessity to achieve a superior quality of sound. Station WKLS is just such a station.

As Bob Helbush, chief engineer, states: "We broadcast 100% disc-to-air except for some commercials. So, for maximum quality sound and phase stability, we use the Stanton 681 SE for on-the-air use. We consider it the ideal answer for that application. And our program director uses Stanton's 681 Triple-E for auditioning new releases before we air them".

And Don Waterman, General Manager, added: "Today, every station in the SJR Communications group . . . all eight of them, all in Major Markets . . . use Stanton 681 cartridges on every turntable".

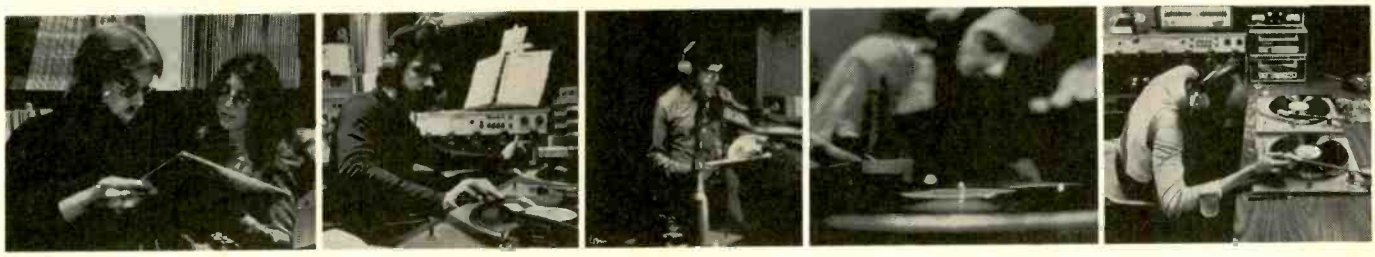
There are good reasons for this vast acceptance. Stanton's 681 Calibration Series cartridges offer improved tracking at *all* frequencies. They achieve perfectly flat frequency response to beyond 20 Kc. And the top-of-the-line, superb 681 Triple-E has an ultra miniaturized stylus assembly with substantially less mass than previously, yet it possesses even greater durability than had been thought possible to achieve.

Each 681 Series cartridge is guaranteed to meet its specifications within exacting limits and each one boasts the most meaningful warranty. An individually calibrated test result is packed with each unit.

Whether your usage involves recording, broadcasting or home entertainment, your choice should be the choice of the professionals... the STANTON 681.

Write today for further information to Stanton Magnetics, Terminal Drive, Plainview, N.Y. 11803.

STANTON



SEE US AT NAB • BOOTH #521 SHOREHAM

Circle 169 on Reader Service Card

recorder when played through a TBC. This interface contains RF head switching circuits along with both fixed and variable equalization, a full bandwidth demodulator with appropriate filters, transient suppression, and output amplifier. Dropout detection keys the TBC's dropout compensator.

Tapes recorded on the 8020 could be, of course, played directly to full broadcast specs when played on Fernseh's BCN 50 machine.

As mentioned previously in the SMPTE report, Ampex and Sony will both be showing production versions of broadcast quality one-inch machines. The real challenge to NAB visitors will be to determine which of the three formats, BCN, Ampex or Sony, all incompatible, is the one to back—if any. We understand there will be a fourth broadcast-quality one-inch format this year. NEC says it will show a TT 3000 one-inch Broadcast VTR studio version and portable, TT 7 and TT 5.

NEC units are cartridge loading. The TT 5, weighing 30 lbs., records 22 minutes. In the ¾-inch format the manufacturers are Sony and JVC with the latter building some for private labels such as Ampex and RCA.

Closing the gap between the ¾-in. and older IVC one-inch machines on the one hand and the new broadcast quality one-inch on the other is the IVC-1070 ChromaCon series. Signal-to-noise ratio has been increased to 47 dB. Visible moiré has been eliminated. Differential phase and gain errors have been substantially reduced. Both audio channels deliver 50 dB. The new video and audio specifications permit multi-generation dubs of up to five generations without significant degradation of picture quality or color accuracy. The IVC-1070 sells for $10,000-$12,000 depending on options. A kit called ChromaCon 10 is available to upgrade existing IVC machines.

In disc recorders, Arvin Echo will show some new controllers for their EFS-1, Frame-Stor®. Eigen Video is adding a new slow-motion, instant replay color video disc recorder with a 20 second duration to its other slo-mo disc recorders.

Open-reel audio tape machines—still going up

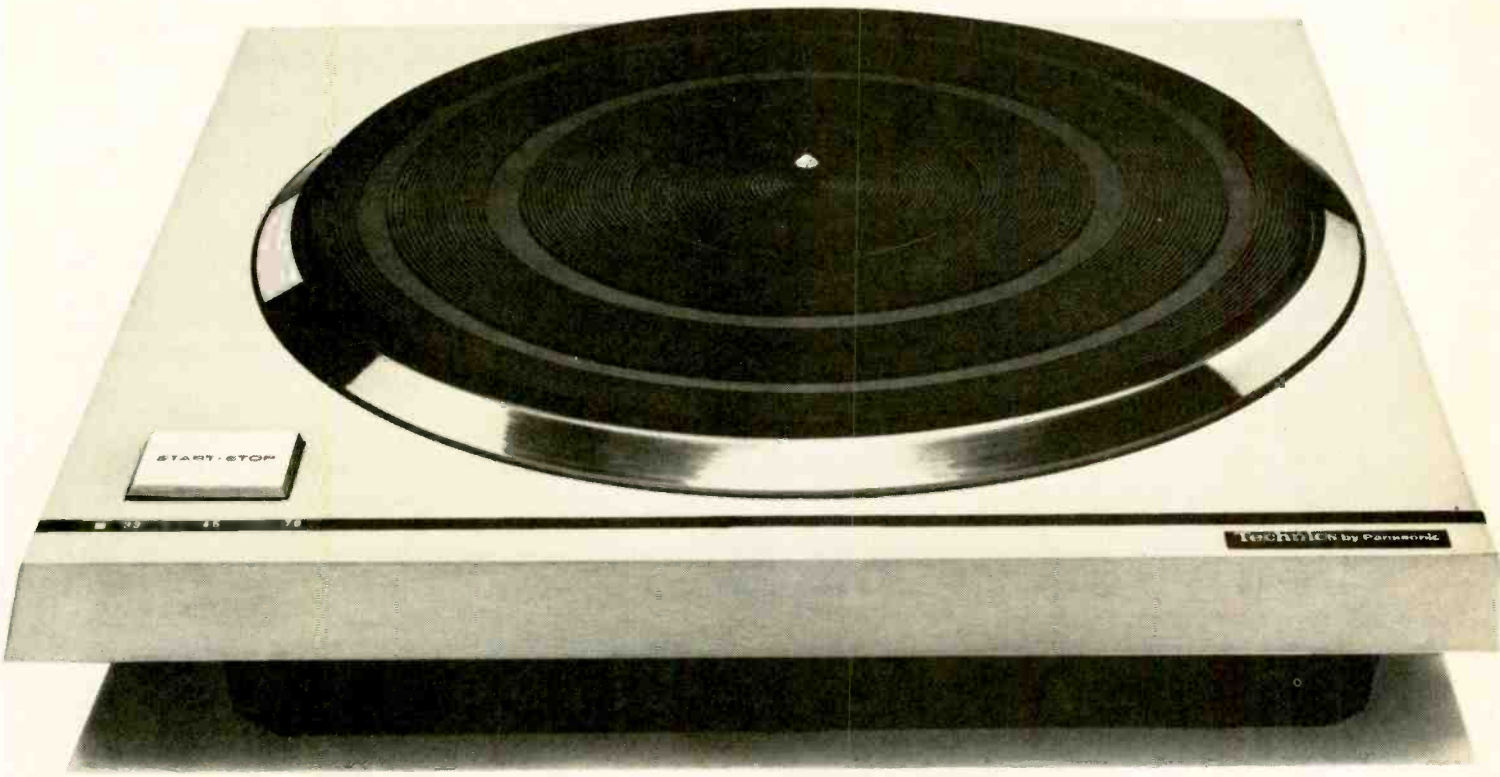
At the top of the shopping list among managers and chief engineers of radio stations surveyed this year were open-reel tape recorders; they will find plenty of choices.

MCI, Inc. of Fort Lauderdale, responsible for several innovative operating conveniences in the past, will introduce another: a SMPTE tape lock system and synchronizer which brings further automation to the editing process, with micro-computer technology to reduce operator stress and greatly speed error-free editing.

In an entirely different direction, Nagra, long among the leading exponents of all-out quality (and high price) in portables, will introduce a new "economy" portable, the "Nagra E," designed specifically for ENG radio use in broadcasting. In the interest of lower price, it is non-synchronous and has a single speed—7½ ips. In the interest of sure operation in the field, it has simplified

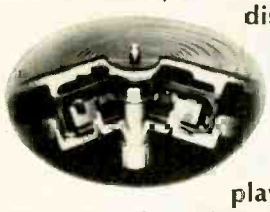
continued on page 110

Your professional turntable cannot match the performance or reliability of this one.



The Technics SP-10 MK II.

Every professional needs the precision of the Technics direct-drive system. That's why radio stations use it. And discos abuse it. But every professional also needs abundant torque. And now you can have it. In the SP-10 MK II.



At 33⅓ RPM, the SP-10 MK II will reach the exact playing speed within 0.25 of a second. That's less than 1/12 of a turn. While it comes to a dead stop in only 0.3 of a second. And you don't have to worry about subtle slowdowns because a tracking force of even 1,000 grams won't noticeably affect its speed.

You won't find any belts, gears or idlers in the SP-10 MK II. But you will find our lowest wow and flutter ever (0.025% WRMS). Inaudible rumble (—70dB DIN B). And a platter that spins at the exact speed (33⅓, 45 or 78 RPM) regardless of fluctuations in AC line voltage or frequency. The reason: A quartz-locked frequency generator DC servo motor.

And the SP-10 MK II is as reliable as it is precise. Even with its abundant torque, you can stop the platter with your hand. Because we designed it to take all the punishment a professional can dish out. Even after years of continued use.

You'll also get all the refinements a professional needs. Like a quartz-locked stroboscope. Remote control. Electro-mechanical braking. A dynamically damped platter. And a separately housed power supply.

The SP-10 MK II. One component in the new Professional Series from Technics.

Panasonic Company
Technics Dept. 903
One Panasonic Way
Secaucus, N.J. 07094
Attention: Sid Silver,
Technical Service Specialist.

Technics
by Panasonic
Professional Series

☐ Send me technical information on the Technics SP-10 MK II turntable.

☐ Have a Technics audio specialist call for an appointment.

NAME _____ TITLE _____
Please Print
COMPANY _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____
AREA CODE _____ PHONE NUMBER _____

Circle 170 on Reader Service Card

operating controls. But the specs are top-grade audio, close to those of Nagra's "recording" models.

The Scully Division of Dictaphone will introduce a new series of recorder/players and players (details not available in advance). Boosting the trend to higher operating convenience and sureness are the addition of constant tension, servo drive, and fixed/variable pitch control to their 280/284B series; and a new digital speed control accessory, the "Varisync."

Panasonic (Matsushita) will show for the first time at NAB, their RS-1500 series of tape recorder/player decks (introduced in late 1976), which were designed primarily for the hi-fi market but claim some characteristics fully up to the top-level "professional" machines. An "isolated loop" tape drive produces flutter and wow rated at 0.018% at 15 ips; frequency response is rated 30-30,000 Hz, ±3 dB; etc.

Otari will show, for the first time at NAB, their new Mark II series, which includes separate transport and electronics for rack or console mounting, DC capstan servo with ±7% speed control, interface jack for DBX or Dolby noise reduction. The series is available with two-channel, quarter-inch format, or four-track, half-inch, at prices from about $2,200 to about $3,200. Also new to NAB will be Otari's 25-Hz cue tone sensor and variable time delay, as an accessory for the ARS-1000, tape machine for automated radio systems. And new to NAB will be Otari's MX-5050 with full-track, single-channel record plus two-channel half-track, switch selectable.

Well established machines will be on display from International Tapetronics, Telex, 3M, Studer, Revox. Ampex will have their new ATR-100, introduced last fall, a high-technology portable.

Cartridge equipment

What seems to be a real breakthrough in cart handling equipment will be shown in prototype by IGM/NTI of Bellingham, Wash. Called "Magna Carta," it provides fast random access to any of 1,000 carts—any cart called up is automatically moved to one of eight playing positions, automatically moved back to its slot after play. The system gets great flexibility in handling from microprocessor control.

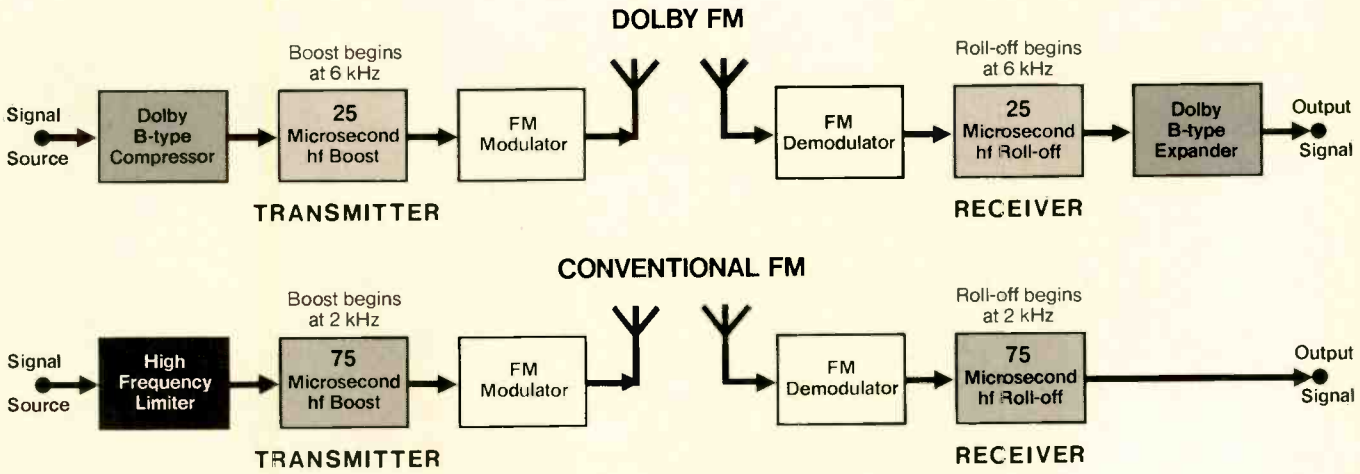
Fidelipac says it will unveil a "major improvement in cartridge technology"—no details in advance of the show. In addition, Fidelipac will introduce a wow and flutter meter.

Broadcast Electronics, a leading supplier of cart playing equipment, will have their 3000, 4000 and 5000 series of cart machines, in single and multiple configurations. UMC Electronics, (Beaucart Division) will have a new economy line of cart players, built around their "inside out" Beau motors.

Audi-Cord, a newcomer in the cart field showing prototypes last year at NAB, will be on hand with their new Modu-cart machines which consists of four independent transports as a single audio source, with internal audio and cue switching. An accessory digital format/remote control will provide an alterable or repeatable

continued on page 113

Dolby FM and Conventional FM Symmetry is the Difference



These block diagrams show the difference between Dolby FM and conventional 75 microsecond FM. The difference is symmetry. With Dolby FM, the circuits at the transmitter are matched by complementary circuits in the receiver. Such symmetry of signal handling has long been valued in disc and tape recording – and indeed in noise reduction systems. Unfortunately, in conventional FM broadcasting the standards were set so long ago (back in the 40's) that modern wide-range program material causes problems; high frequency limiting has to be used, and thus there is an extra process at the transmitter which is not matched by any complementary treatment in the receiver.

The Dolby B compression and expansion system is well known for its mathematically exact mirror-image operation; this is a key element in permitting FM stations and receivers to function in a symmetrical way. Here's how. First the conventional 75 microsecond high frequency boost and roll-off are reduced to the point where high frequency limiting is no longer required at the transmitter (this happens with a reduction to 25 microseconds, which gives a boost and cut beginning at about 6 kHz instead of 2 kHz). Unfortunately, this step is inherently accompanied by about a 5 dB increase in receiver noise. In the second step, however, the addition of the Dolby B system not only takes care of the additional noise but results in a noise level some 5 dB lower than conventional FM.

Thus, the overall effect is that about half of the 10 dB Dolby noise reduction capability is traded off for symmetrical signal handling. But, considering the two extremes of the dynamic range, there is still a genuine *total* increase of 10 dB in available dynamic range above about 3 kHz.

If you like the idea of a symmetrical FM system with reduced noise, then we invite you to write to us for further information. The following information is available:

1. Technical details and explanations of Dolby FM.
2. A list of stations with Dolby FM encoder units.
3. A list of receivers with built-in Dolby FM circuits.

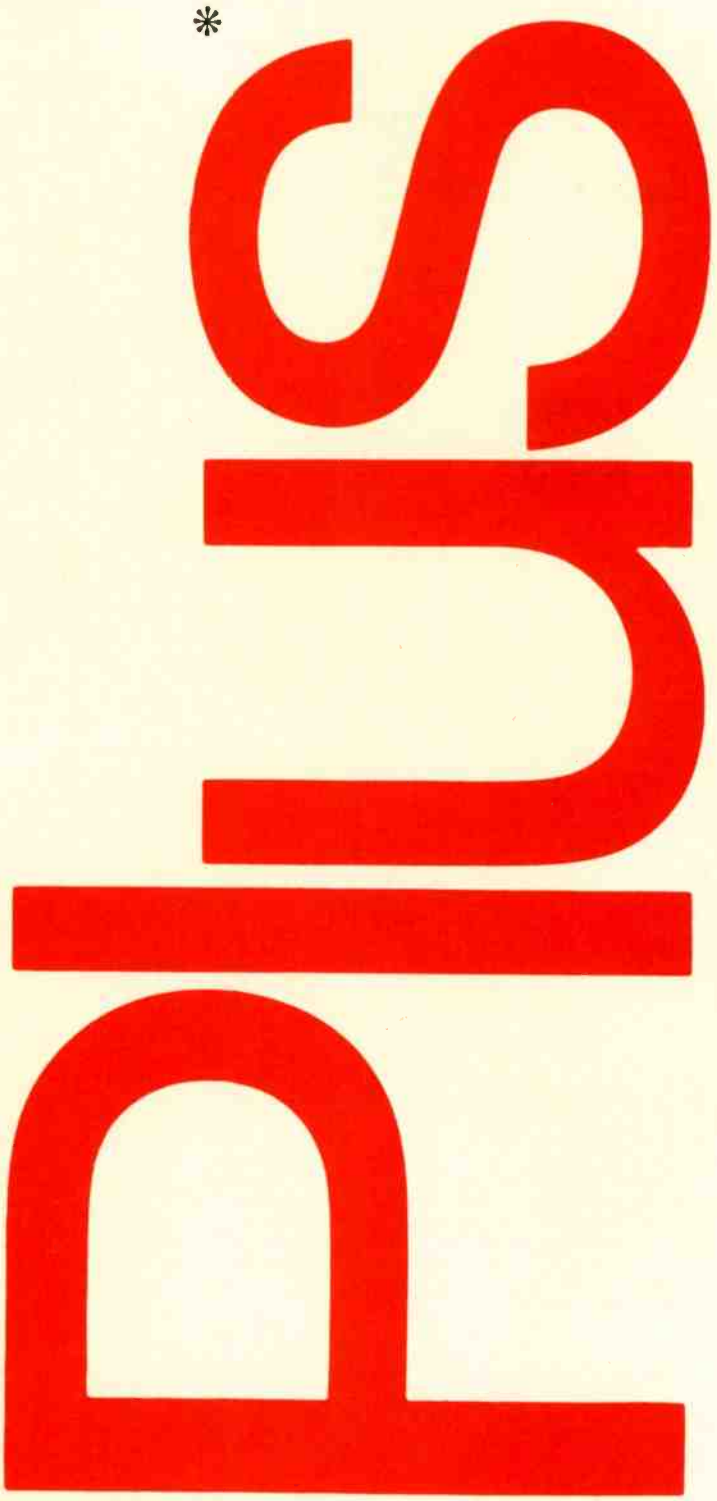
Listening to Dolby FM

Basically, listening to the improvement brought about by Dolby FM is like listening to any audio equipment improvement – such as those made to turntables, pickups, amplifiers, and speakers. A particular improvement in a component may well be there all the time, but its noticeability will depend on various factors, such as the listening environment or the type and quality of the program material.

In the same way, the overall Dolby FM listening improvement is subtle most of the time: occasionally, however, it will be quite obvious. It should be remembered that in FM the 10 dB action of the Dolby system is distributed nearly equally between the low-level noise and the high-level signals. The audibility of any change is therefore less obvious, and depends more on program material and other conditions, than the effect of the Dolby system on cassettes.

Relative to the hiss level of conventional broadcasting and reception, a somewhat (but not startlingly) reduced hiss will be noticed by listeners with weak-signal reception conditions; listeners with a strong signal will note no change (as with conventional FM, the noise will be determined by the station's source material). Listeners in any reception area, though, will notice a full recovery of source material high-frequency dynamics, regardless of signal strength. On most stations, cymbal crashes and other program material containing high-level high-frequency components will sound distinctly brighter and cleaner. Otherwise, for those rare stations which conventionally hold down modulation in order to preserve high-frequency signal integrity, the introduction of Dolby encoding allows an increase in overall level by several dB. Of course, this increase will be apparent to all listeners, regardless of location and whether or not they have receivers equipped with Dolby FM circuits.

We think that critical listeners can hear and enjoy the various improvements described above often enough to make the extra cost of Dolby FM well worthwhile.



*It's incredible!
See it at NAB

MICROTIME

Circle 173 on Reader Service Card

sequence of automatic plays from a single start command, providing low-cost automation for news or sports programs preceded or followed by commercials and IDs.

Telex will show a new line, eight models, of cart reproducer/players, the Telex/Magnecord MC Series.

Other firms with established cart machines to show will be Harris, Sparta (Cetec), Ampro, ITC, RCA, SMC, Plenty!

Remote control—ATS equipment

Digital techniques and microprocessor control have been raising the efficiency, accuracy, and versatility of radio's remote control equipment for a number of years, and this advance was one of the reasons the FCC opened the door to automatic transmitter systems (ATS) for certain classes of radio station. Manufacturers experienced in the production of radio remote control equipment are naturally well placed to supply ATS needs.

Comark Industries will show a new microprocessor-based remote control system, with keyboard entry allowing control and monitoring of up to 256 analog or digital functions over a 3 KHz audio link.

Moseley Associates will have a wide range of new systems of high efficiency particularly adapted to ATS applications. The new TCS-1 Telecontrol System has eight independent command channels, and eight status channels, operates over a 3 kHz telco or radio link, takes only 1¾ in. of standard rack space. The new DCS-2A digital control system has a very wide range of control and monitoring functions, can be had with computer control, is also well adapted to ATS requirements.

Marti, also long a main supplier of radio remote control equipment, will have their various systems on display with particular attention to their applicability to ATS. The same applies to another long-time supplier in this area, Delta Electronics.

Harris Corporation will introduce a complete ATS, which may be programmed with up to 1400 time functions to monitor transmitter readings and initiate corrective action. It will be in operation with the MW-1A transmitter.

Bird will also aid the ATS movement with their new Model 3170 highspeed "Wattcher" monitor control for remote or on-side supervision of transmitters.

Time and Frequency Technology promises new equipment for transmitter remote control—ATS applications; this firm's reputation for AM and FM monitors, EBS equipment etc., suggests that their approach to ATS should be investigated. A company new to remote control, Eric Small and Associates (known so far mainly for the Optimod FM limiter) has also promised some brand-new ATS equipment.

Transmitters, FM, AM, TV

Among the radio transmitters themselves, the continuing movement to all-solid-state design is also smoothing the way to ATS—although any class of transmitter can be a part of an ATS. There is a broad sweep of new, better radio and TV transmitters on display this year.

RCA will boost the solid-state movement with an all-new 5-kilowatt AM transmitter, completely solid-state. The Sparta Division of Cetec will return with the SS-1000A first shown last year.

Harris Corporation, one of the pioneers of the solid state transmitter, will have an improved 1 kW solid state, the MW-1A, with Progressive Series Modulation, and also new 5 and 50 kW transmitters, the MW-5A and MW-50A, which have pulse duration modulation. All three now have built-in audio processing to increase modulation density.

Harris will also have a completely new line of FM transmitters, with the FM-2.5K at 2500 watts and the FM-20K at 20 kW. Both will have a new solid-state FM exciter with digitally synthesized modulation. Harris claims for this extremely high stereo separation and a 2 to 6 dB increase in loudness with no signal deterioration.

Also new will be a line of Harris TV transmitters, with the BT-25L2 leading the line, with IF modulation, and the MCP solid state exciter with transversal sideband filter. This filter introduces no group delay and has no tuning adjustments. It is only 1½ square inches in area. The visual exciter will be in operation.

Collins will have a new AM and a new FM transmitter to add to their extensive line introduced in recent years. McMartin will continue enlarging their line of transmitters—developed in the last two years—with new high-power FM transmitter, the BF-55K, with 55-kW output. Basic components are the McMartin B-910 solid-state FM exciter and two identical McMartin BF-25K transmitters; outputs are combined for a single 55 kW of RF, but if either transmitter fails, the other continues on the air at reduced power, a guarantee against broadcast down time.

Wilkinson Electronics will show their line of transmitters and transmitter accessories, and will introduce a new FM transmitter, the FM-1500E, with 1.5 kW of RF output.

CSI, who introduced an expanded line last year, will push along the solid-state movement with a new all-solid-state FM transmitter for 250 watts. Acrodyne Industries will bring in a new 6 kW visual, 600 watt aural TV transmitter, externally diplexed, to add to their well-known line of lower-powered TV units.

Another all-solid-state AM transmitter at 1 kW is the TAM-1K-B to be introduced by Sintronic Corporation, to add to their line of AM and FM units.

CCA will introduce a new 10-watt educational FM transmitter, Model 10E; and two high-powered FM's, the 4-kW FM-4000E and the 55 kW FM55000-EP. Also new will be the series of CCA modular consoles, and the CCA "Optimod" FM stereo generator/limiter. And CCA will add a new TV transmitter: the TA-55-BT, a 55-kW UHF model.

Among the new separate units and accessories for transmitters is the Model 675 FM exciter from QEI. It uses frequency synthesizing to produce any FM channel in the band. Stability is rated at ±500 Hz, 10°C to 60°C. Power output is adjustable 5 to 20 watts (exciter can be used as a low-power educational FM transmitter), distortion is rated 0.35% maximum at 75 KHz deviation, harmonics and spurious signals at below −80 db.

Dummy loads will be shown by Electro Impulse, who will introduce a new dry 10 kW load for FM transmitters, and by Bird Electronics.

CP antennas will get close inspection

There will probably be more than the usual activity

continued on page 114

around the booths of those manufacturers exhibiting CP antennas for television. With the impending approval of CP (see article on CP elsewhere in this issue), the interest in CP can turn serious. Harris will have CP antennas available in both highband and lowband VHF as will Jampro Antenna, part of the Cetec Broadcast Group. Jampro will also have UHF CP antennas.

RCA is also a leader in CP antennas and has sold one for Channel 2 and possibly another for Channel 5. Each of the three companies has a radically different design and we'd expect some interesting presentations on each antennas merits. Although we haven't heard directly, we expect Alford will be showing CP designs for TV.

Remote pickup and STL

"Remote pickup" is currently being strongly stimulated and advanced by radio's swing toward a fast-moving, on-air-from-everywhere ENG, following the example of TV's ENG excitement. For example, see article in this issue on the new CBS ENG system in Washington. The long-established makers of remote pickup equipment are supporting the trend with advances in equipment. Marti Electronics will show their "Generation Five" remote pickup equipment, which includes new hand-held transceivers, easily carried "bricks" of 2 pounds and less, on 150 and 450 MHz with the new higher grade of audio quality and longer reach.

Plenty of microwave action

In the area of microwave transmission, numerous improvements have been made to benefit ENG and other microwave applications such as MOS. Nurad has brought out a new antenna system for extended range ENG operations in the 2 GHz band. The system, designated 20 SQ1 Superquad™, consists of a high gain, quad polarized, pedestal mounted antenna assembly with a totally enclosed radom and operators control panel. The quad-polarization permits the operator to select the optimum received signal (clockwise circular, counter-clockwise circular, horizontal linear or vertical linear). The new system can operate as a stand-alone or in conjunction with the Nurad 20 AP1, now employed at more than 100 stations.

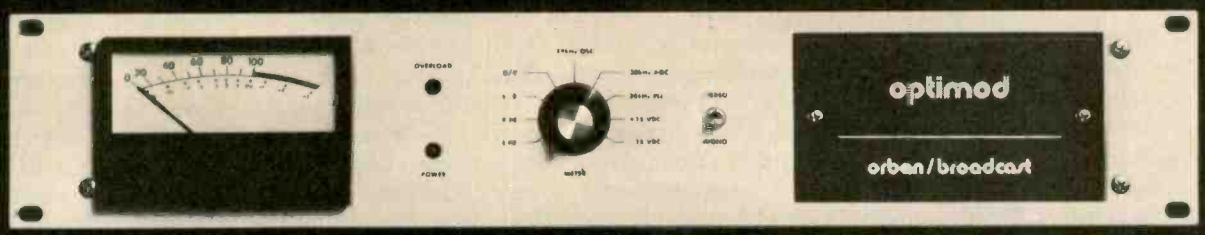
Farinon has added a new FV "mini-link" miniature Portable Microwave unit for the 2 and 13 GHz bands. This system features dial-tuning across each band, built-in program channel, AC or battery operation with built-in recharger, optional 24V battery pack, and switchable antenna polarization. The system can be equipped with a conical antenna with a 1.5 mile range or a parabolic antenna with a 26 mile range. We don't have details but also know that TerraCom will show miniature window-type microwave gear. The TCM-7 series is the "Miniwave" transmitter and the receiver is called the TCM-3. This system combines the versatility of receiver remote channel selection and the portability of the small, lightweight "Miniwave" transmitter.

Microwave Associates is bringing out two new products in this field, a PA-215M 15 W maximum solid-state 2 GHz RF booster and an MA-2CP all channel 2 GHz high power portable ENG link.

Electronics, Missiles & Communications, Inc. will be

continued on page 116

OPTIMOD-FM
...it practically installs itself.



See it live in booth 539—Shoreham Hotel

You've heard of OPTIMOD-FM... the FM signal processing *system* that redefines the state of the art by combining limiter, compressor, and stereo generator in a single package. What may not have occurred to you is the remarkable convenience of being able to set the system up with only seven controls... compare that with a convertional system!

Audio processing is fully characterized by the *left and right Input Attenuators* and *Release Time* (that's three); the stereo generator sets up with *L-R Gain*, *Pilot Phase*, and *Pilot Injection* (that's six), and you match the system to the gain of your exciter with the *Output Attenuator* (that's all!). From that point on, it's hands off. Installation is easy too, because OPTIMOD-FM interfaces to a transmitter or STL.

The payoff is a brighter, cleaner, louder signal. Users have reported increased coverage and improved subjective stereo separation. Program directors are blown away by the transparent, high-definition sound... sound that can hold audiences by eliminating listening fatigue. Sales managers love presenting advertisers with a sound that compares with the audio quality of major group and network stations—many of whom have already bought OPTIMOD-FM and consider it the new industry standard. And the GM will love what the station's improved quality can do for his bottom line.

Let OPTIMOD-FM make your job easier... while it delivers spectacular results. Available through selected dealers, call us for more information toll-free **(800) 227-4068*** We'll send complete technical information for your evaluation.

orban/broadcast

Eric Small & Associates, Marketing and Sales Agent
680 Beach Street, Suite 315, San Francisco, CA 94109 (415) 441-0666

Orban/Broadcast products are manufactured by Orban Associates San Francisco, CA

*In California (415) 441-0666

Circle 175 on Reader Service Card

exhibiting a number of new products in this area. The chief advance is EMCEE's TTS-10E-M, MDS Transmitter. This new television transmitter features the ultra-linear ceramic triode output amplifier tube and solid-state driver which enables the MDS operator to provide broadcast quality transmission. The transmitter's high degree of linearity allows the use of various signal scrambling systems for transmission security.

Satellite equipment

For the smaller dish earth stations now approved, Scientific-Atlanta has developed the Model 414A Video Receiver which provides additional signal-to-noise margin for small antenna users and operates at lower carrier-to-noise rations. The 414A will process any video format used in satellite transmissions. Numerous standard plug-in units can be supplied to allow configuration of the receiver for any video satellite transmission without requiring any chassis interconnection or change.

Audio consoles, mixers

Main general trend in the larger consoles is toward automation; in the smaller ones toward incorporating operation facilities taken over from the large ones.

Automated Processes will bring in a new family of consoles, and automation-readiness will be prominent in a number of them. Neve will show "comprehensive radio consoles," with high-level characteristics this firm has provided for a long time. Ramko has some pioneering ideas in a new line of consoles: a 4-year warranty, mixers and switches guaranteed for 20 million operations, backlighted channel displays, easily modified by user to show graphics, numbers, or other messages.

The Microtrak System D Newsdesk.

Robins will continue the Fairchild specialty of modular design with a new set of modules for broadcast audio. LPB will show a new Model S-21, 10-channel dual mono board. Collins will have a new stereo console.

McCurdy will bring in a new modular dual-mono series, the SS8400, which includes a large series of options as to features wanted, among them audition, cue, solo, echo send, equalizers, compressor, oscillator, digital clock, etc. Any or all can be plugged in, as wanted,

continued on page 121

Get your hands on the TKP-45 from RCA.

TKP-45 versatility gives you complete control, inside and out.

A lightweight camera is a good investment only if it can put you in full control of any production situation, in the studio or on location, inside and out.

On that basis, the go-anywhere, shoot-anything TKP-45 camera system is a superb investment. As more than 100 TV stations and teleproducers have learned since its debut.

Big camera features.

Here are the blue-ribbon features—all standard—that make the TKP-45 camera a standout:

- Shock-mounted optics
- High Performance input amps with full level video outputs
- Quick-change wedge plate and lens mount
- Automatic white balance, black balance, iris control, pulse advance, voltage regulation
- Scene contrast compression that compensates for strong lights and heavy shadows
- Built-in contour enhancer with coring and comb filter
- Chroma key outputs
- High sensitivity
- Prismatic bias light

The one-camera camera system.

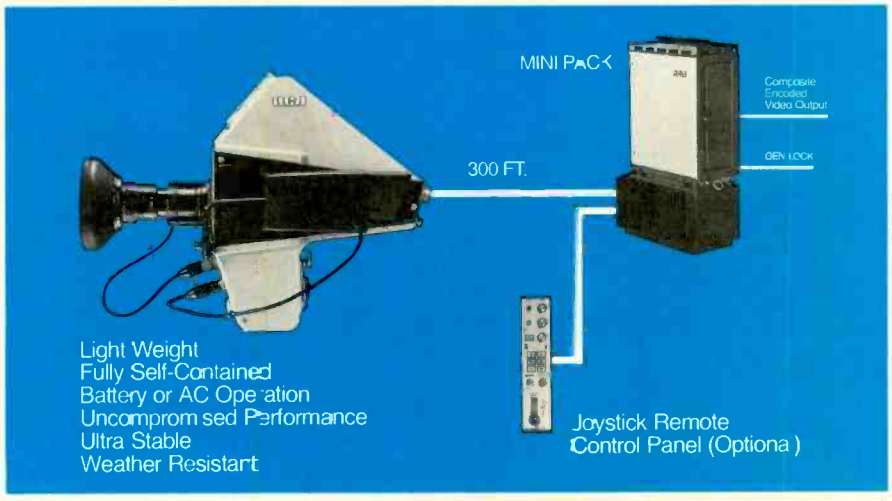
TKP-45 adaptability to any production challenge is enhanced by a wide choice of matching accessories for powering, viewing, supporting and shooting. They turn the TKP-45 from a quality camera into the one-camera camera system.

For power, plug in our battery- or AC-powered Minipack for ultra-portable application.

For viewing, choose from two tiltable, interchangeable viewfinders, 3″ and 7″. Either is suitable for location or studio use.

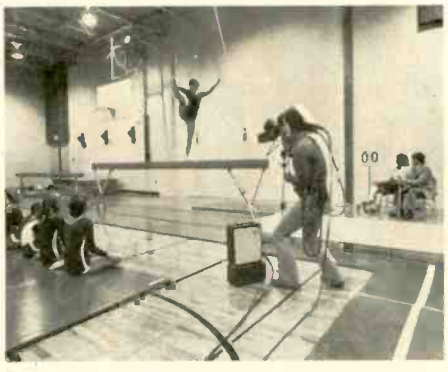
Support is made easy by a

LENSES	Zoom Range	Focal Length	Hor. Angle of View	Aperture	Minimum Obj. Dist.	Weight
ANGENIEUX 6 x 13 D1 	6 to 1	13-78mm	52.4°-9.5°	f/2.2-f/3.	0.45m 18 in.	1.1 kg 2.4 lbs
ANGENIEUX 10 x 16 T 11 	10 to 1	16-160mm	43.6°-4.2°	f/2.	1.4 m 54 in.	3.1 kg 6.9 lbs
CANON PV 10 x 12 B 	10 to 1	12-120mm	55.4°-6°	f/2.-f/3.1	0.45 m 18 in.	2.5 kg 5.5 lbs



wide variety of tripods, unipods, shoulder mounts, and studio camera bases.

As for shooting, the TKP-45 accepts the zoom lenses on this chart—plus a fixed lens adapter which accommodates a wide variety of fixed focal length lenses ranging from fisheye to multiple-image.

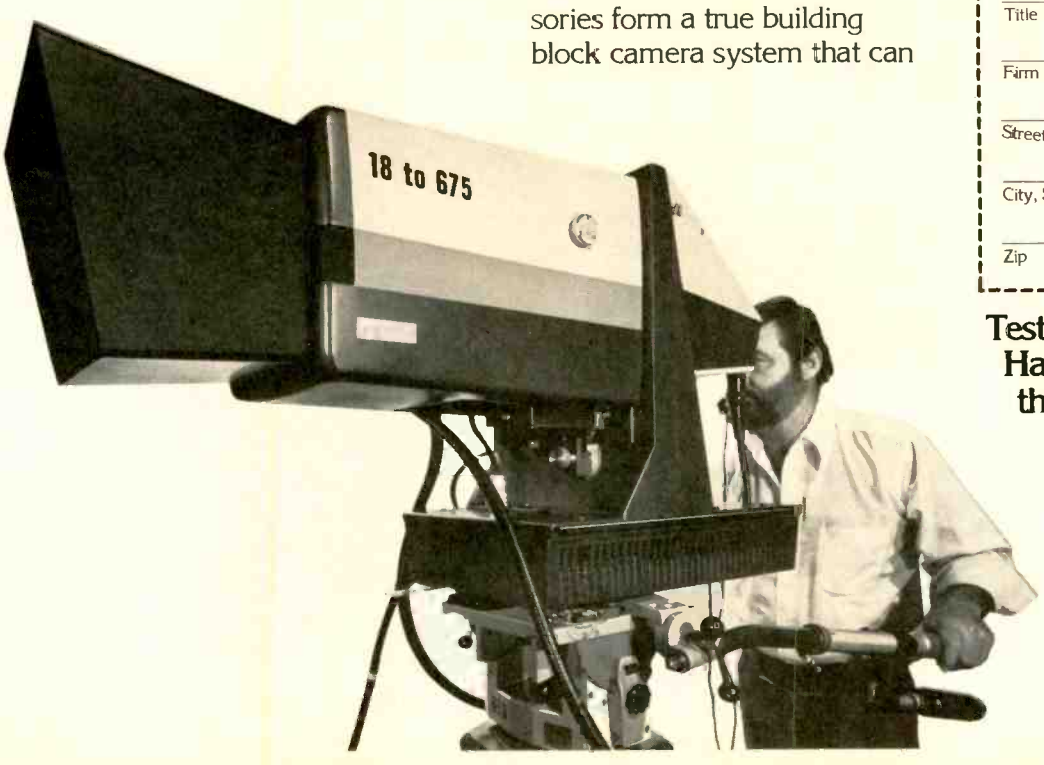


The full-sized TV camera.

You get big camera capability when the TKP-45 includes a Minimax adapter that accepts a range of full-size lenses for studio and field production. Minimax allows longer zoom ranges, higher lens speeds and unexcelled optical quality. With Minimax, the TKP-45 handles like a full-sized TV camera (below).

The versatile investment.

The TKP-45 and its accessories form a true building block camera system that can fill any production, commercial and news assignment with an unmistakable stamp of quality. And its ability to go almost anywhere and shoot almost anything assures you of maximum return on your camera investment.



Learn more, now.

To see how fully you can control any picture situation with the TKP-45, you are invited to contact your RCA Representative or simply send us the coupon.

Then, get your hands on a TKP-45 yourself. You'll see why the one-camera camera system is doing so much for so many.

Why not test it at our NAB Hands-on Headquarters?

BM/3/77

RCA BROADCAST SYSTEMS
Building 2, Front & Cooper Sts.,
Camden, N.J. 08102

I'd like to see just how the TKP-45 meets my need for quality and versatility. Please contact me; no obligation, of course.

Name

Title

Firm

Street

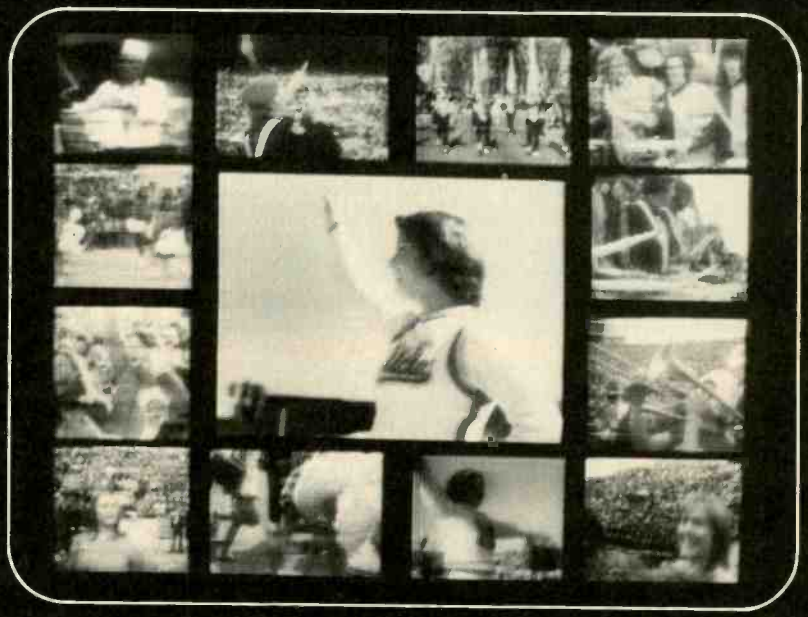
City, State

Zip Telephone

Test a TKP-45 at our NAB Hands-on Headquarters, the Washington Hilton, March 27-30, 1977.

RCA

The Dependables



NCAA Football lead-in courtesy of ABC Sports and Image West.

GREAT MOMENTS IN DIGITAL VIDEO HISTORY.

THE FRAMESTORE SYNCHRONIZER BECOMES A TOOL FOR ENG AND PRODUCTION.

AND MICRO CONSULTANTS IS THERE WITH THE QUANTEL DFS 3000.

Our DFS 3000 is a lot more than a synchronizer. It makes ENG more practicable, more professional, more profitable than ever before.

It takes only 8¾ inches of rack space. Of course, it's also portable —and rugged enough to take the rugged treatment portable units get.

It makes production more vibrant than ever before. It lets you compress live images. Move them around with a "joystick." Freeze them. Run them through your switcher for special effects. Make hot cuts. Time base correct. And control everything from a remote panel.

It's been used by networks and local stations to enhance practically every recent major television event you can think of. The Olympics, the primaries, the political conventions, Seattle's Sea Fair, Monday Night Football, the Super Bowl, and more.

Local stations also use it to zip up their news programming. Production houses (like Image West) use it for innovative post production.

See for yourself. Ask for a demo **in your own facility.** Write or call Micro Consultants, Inc., P.O. Box 10057, Palo Alto, California 94303, (415) 321-0832.

The digital video people

Circle 177 on Reader Service Card

since all are on modules designed for instant addition to the system.

Microtrak, which specializes in the design of complete studio facilities, will have their new System D Newsdesk, a news production system, an integrated studio assembly designed specifically for getting news on the air. Also: the system D audio production system, a five-channel mono console.

To pack the shelf with consoles to the overfullness the industry has come to expect, high-grade consoles will also be on hand from Ampro, Cetec, Auditronics, Harris, McMartin, RCA, Shure, Wilkinson, Ward-Beck.

Audio for television

There will be several new products for television audio. Auditronics is featuring a Model 110V TV Audio Production console with 32 mixing positions, 8 sub mix groups, 8 program outputs, 2 foldback outputs, 2 echo send/return channels, talkback, control room and studio monitoring. Another new item is the President News Bridge for Television news conferences from Sescom, Inc. This is a passive news bridge which can handle up to 16 simultaneous feeds with 70 dB of isolation.

Dynair Electronics, Inc. is bringing out a new series of audio distribution amplifiers in their 5900 line and they will have the Model AD-5980A on display. Utilizing techniques that have provided advances in the radio and recording industries, Industrial Sciences will premier the ISI 700 series Audio Consoles for television with echo, foldback, equalization, tone generation, digital timing, intercom and expanded monitoring and cueing.

In microphones, Thomson-CSF will add single and dual-channel 950 MHz microphones to their wireless line.

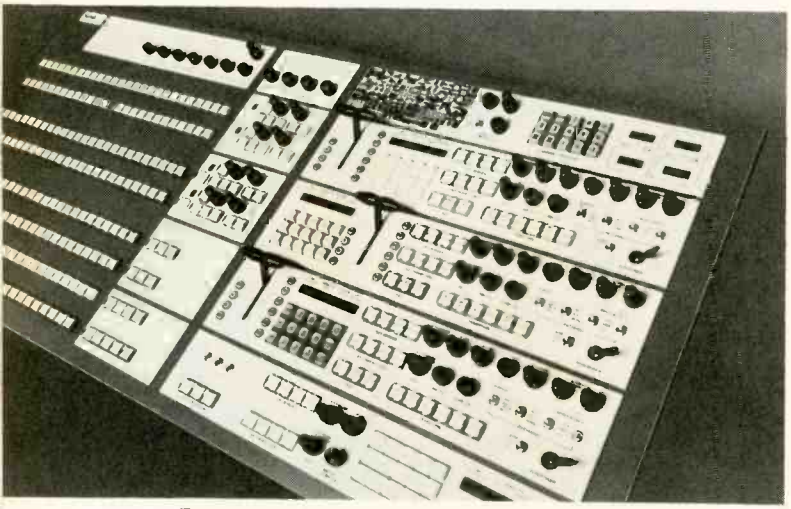
Plenty of TV production switchers, other switching devices

A whole raft of production switchers will be seen in Washington. Duca-Richardson Corporation, which is a comparatively young company that has entered the broadcast industry with a big splash, will show its new top-of-the-line video production switcher, the DRC Series 4000. The 4000 will have color coding with simplified operation procedure to ensure against operator error, 99 time choices for automatic transitions, key boards for selection of patterns, transitions key sources, and quadrant presetting, and downstream keying among other features. There are also 99 pattern choices, 10 key sources and 6 chroma keys. The status of the switcher is always indicated by status lights and all basic switcher functions are consolidated in function modules.

American Data Division, Airpax Electronics, is hailing the "4th Generation Production Switching System" with its Models 558-2 and 558-1 Series. These systems feature four channel parallel video processing and allow multiple mix/wipe/key functions to be performed simultaneously on a single mix/effects amplifier. American Data will also have the new 2100 Series Production Switchers at the show.

Though the big entry from the Grass Valley Group is their digital effects system described earlier, GVG will also show a new 1600-1L Switcher and their M200 TV

continued on page 122



The flexible Duca Richardson Series 4000 production switcher.

Automation System.

As mentioned both in our last issue and earlier in this report, Vital will be there with Squeezoom switchers that will squeeze, freeze a full frame and zoom a picture. These two switchers—Grass Valley and Vital—are likely to be show stoppers and they should be looked at carefully.

Central Dynamics Corp., will feature the CD 480 Video Production Switcher with Sequential Effects (SFX) Amplifier and will have their System 100 Master Control Automation system interfaced with the BIAS Business automation system.

Richmond Hill Laboratories, Ltd., has added to its VPM 3000 Series of production switchers, a new model, the VPM 3112. A new company to NAB this year, Beaveronics, Inc. will debut two new production switchers, Models 154 and 156. The company will also display selected terminal equipment and FAVAG clocks.

Dynasciences will show a new production switcher and special effects generator. Communications Technology will introduce its new Model 3300 production switcher and its ENG 1000 Assignment Switcher. Shintron will show a "professional" Model 375 Chromatic Switcher intended for medium and large-scale teleproduction applications. For a relatively small switcher, the 375 sports quite a number of special effects and sophisticated features.

Microprocessor technology has been used in the new 3M Model 516 Video Production Switcher to provide improved operation and reliability. The microprocessor also permits the switcher to "remember" up to four programmed events for recall during production. More than 20 effects can be selected by a 10-key input bank, and additional patterns may be incorporated in the future. Twelve inputs, including black burst and color background are available and effects are generated in hard-switch, soft-switch, or border-wipe form. Chroma key input and additional memory capacity are optional. The device will be in the $12,000 to $14,000 range depending on options.

The only new Master Control Switcher announced

continued on page 124

...at NAB get the feel of a REAL switcher... the incomparable CD-480

Booth 104
Sheraton Park

Circle 180 on Reader Service Card

CENTRAL DYNAMICS LTD

CANADA
Montreal
14⁷ Hymus Blvd.,
Montreal, Quebec H9R 1G1
Phone—514-697-0811
TWX—610 422 3906

U.S.A.
New York City
230 Livingston Street,
Northvale, NJ 07647
Phone—201-767-1300
TWX—710 991 9753

Chicago
331 West Northwest Highway,
Palatine, IL 60067
Phone—312-991-4720
TWX—910 693 4805

Los Angeles
15130 Ventura Blvd.—Suite 307,
Sherman Oaks, CA 91403
Phone—213-789-0574
TWX—910 495 1713

before NAB is from Industrial Sciences, Inc. which will display its new ISI 800 series. The ISI 821 will feature simultaneous audio/video audition, auto transition, programmable pre-roll counter, chroma key, key edger, and full audio system with booth mic input. Most of the other master control switcher manufacturers will continue the lines introduced previously but have added features and refinements.

Three new routing switchers will be in Washington. Communications Technology will show its new 40X Series Routing Switcher, Datatek Corp. will feature a 30 × 10 Video/Audio Routing switcher, and Di-Tech Inc. will roll out their new Model 5400 Audio follow Video Routing Switcher. Dynair has something new in distribution amplifier switchers as described elsewhere.

Editing highlights

Those who visit the TRI booth to get a line on what this California manufacturer has going will see the new EA-6 edit controller most probably interfaced with Ampex VPR-1s and possibly quad machines. The EA-6 is of modular design, incorporating the EA-3 and features programmable editing, SMPTE time code and SUN. TRI will also have its standard line of editing and time code products and a demonstration of Tri-Chroma, a method of handling the video signal outside the NTSC standard to increase its quality and reduce noise from generation to generation. (See box, "TRI Will Offer Tri-Chroma") In addition. TRI has promised to unveil several new products which are "truly startling."

Datatron will return with its Tempo '76 Editor utilizing both SMPTE time code and pulse counting techniques. As an added attraction, Datatron will conduct a contest among visitors to its booth, the winner of which will get a $7600 Tempo '76 Editor complete with electronic interface package. Convergence will have its regular line of editing equipment with modifications and add-ons not previously seen at NAB. CMX will not have any brand new equipment but will demonstrate the 340 systems introduced last year working with numerous VTRs.

Update on character generators and graphics generators

TeleMation's Compositor I Titling/Graphics system will be shown in a new dual configuration for the first time in Washington. The dual units can be operated independently allowing one keyboard to be used for page composition while another is used for on-air display or the units can be operated together providing for preview and program display. Using the new configuration, it is possible for a news director, for instance, to change copy, edit, delete, or reorder, while another page is on air.

3M, under the theme of Application of Microprocessor Technology to Titling, Visual and Imaging Systems, will show several new products. Among them is the Model D-8800 Dual Microprocessor Character Generator. One of the chief features of the D-8800 will be the expandable nature of its programming capabilities, as new programs are written to accomplish new

continued on page 126

NAB BOOTH 300 Sheraton Park

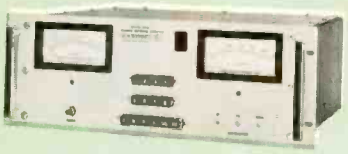
DELTA ELECTRONICS

NEW OIB-3 OPERATING IMPEDANCE BRIDGE – The new OIB-3 features direct reading of 'R' to 1000 Ohms and 'X' to 900 Ohms. The OIB-3 also contains an integral rf amplifier.

NEW TCA-N-EX AND TCA-N-EXR SERIES RF AMMETERS – Equipped with output provisions for direct attachment of remote reading meters. Complies fully with new FCC regulations for remote metering.

NEW Several new products including the AMC-1 Automatic Modulation Control Unit for ATS will be on display at the NAB Show – Please drop by.

Antenna Monitoring



AAM-1 ANALOG ANTENNA MONITOR – FCC type approved. Provides accurate true ratio and phase readings. Easy to interface with existing control systems. AAMH-1 provides hardwired remote control of AAM-1.

DAM-1 DIGITAL ANTENNA MONITOR – FCC type approved. Provides digital readout of amplitude, ratio and phase. Also available: DAMA-1 Base Current Adapter for remote digital readout of antenna base currents; DAMX-1 to extend capacity of DAM-1 up to 12 towers.

Transmitter/Antenna Remote Control

TMCS-1 TRANSMITTER/ANTENNA REMOTE CONTROL SYSTEM – Provides digital readout and control of the DAM-1 and transmitter over a single voice channel. Other systems available: DAMR-1/DAML-1 for digital readout and control of the DAM-1 only; DAMH-1 for use where the remote control point is close enough to the monitor to permit hardwired inter-connection.

Measurement/Test Instruments

OIB-1 OPERATING IMPEDANCE BRIDGE – For antenna system measurements under transmitter power. May also be used as a conventional bridge.

RG-1B RECEIVER/GENERATOR – Two-watt signal generator with a tracking detector. Built-in rechargeable battery power supply for full portability in making low power impedance measurements. For use with OIB-1 or other RF bridges.

CPB-1 COMMON POINT IMPEDANCE BRIDGE – Monitors common point impedance continuously. Designed for permanent installation.

Other Products

TCT-( ) TOROIDAL CURRENT TRANSFORMER – Provides accurate, stable R.F. samples for phase and amplitude measurements. Available in three sensitivities. Also available: TCTR-1 Compensated Rectifier Circuit to provide DC voltage for remote current measurement when used with TCT-( ).

MJ-50 METER JACK – A make-before-break in line jack assembly that permits "hot" insertion of OIB-1 Bridge or Ammeters.

DELTA ELECTRONICS

5534 PORT ROYAL ROAD
SPRINGFIELD, VIRGINIA 22151
TELEPHONE: 703/321-9845 TWX: 710-831-0620

Circle 182 on Reader Service Card

tasks, they can be added to the machine's instructions. As we mentioned last month, 3M will also have its 300-page Random Access Cartridge Memory system on display as another feature of its character generator system.

Thomson-CSF's Vidifont System will be sporting a new multiframe feature. Chyron Telesystems will be showing character generators also but the highlight for them will be graphics capabilities. A new joystick control has been added to the keyboard console to maneuver patterns and shapes pulled from Random Access Memory.

Lighting is controlled by the microprocessor

In lighting, as in almost every area of television, the microprocessor is showing its influence. Strand Century will exhibit its memory lighting control system which also relies on computer based technology. New lighting systems and lighting control systems will also be shown by Berkey Colortran. Berkey will include their Memory II Lighting System and a new dimmer module, CRD-B. A 10X in. Fresnel and a 6 in. Fresnel will also be there. The 10X in. Fresnel is billed as a low cost item having high output performance for medium to large TV studio lighting.

Not all the lighting people are offering new things in the shape of bulbs. Rosco will exhibit Roscolux, "the newest most heat stable color media in the widest number of colors." Included in the exhibit will be Cinegel, the Academy Award winning range of materials for TV and motion pictures; Roscoscreen, a selection of front and rear screen projection materials; and Rosco lights, an array of HMI lighting equipment including 2500W, 1200W 575W, and a portable 200W system.

Automation interfaces are prominant

In the world of business automation systems, the story is the continuing development of master control—business automation interfaces. The BIAS system from Data Communication Corp. will be there and will be interfaced with CDL and Vital. BIAS is just hot off a successful interface with a CDL system 100 Technical Automation System at WNAC-TV, Boston, which went live Feb. 4.

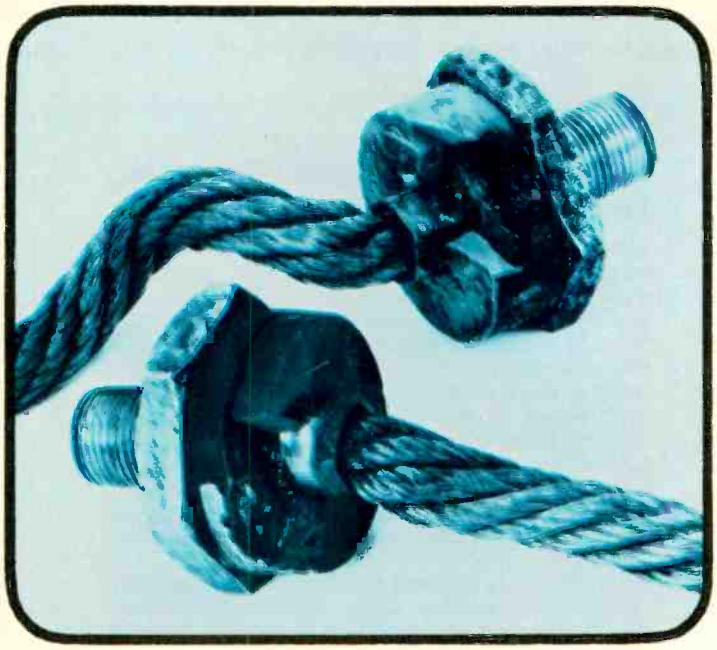
Paperwork Systems, Inc. (PSI) will show the Datapoint 4520, 4220, and 1154 Computer Systems. PSI will also feature a new high speed printer, the Centronics 104, a 200 line per minute machine. Though PSI has concentrated on radio and cable business systems in the past, television business systems will also be featured this year.

BCS/Kaman Sciences will be interfaced to a Vital technical automation system for demonstration purposes. BCS has achieved full technical interface with a number of Metromedia stations utilizing CDL automation equipment and has recently interfaced with a Vital system at KTVT, Dallas. This year, BCS-100, the radio business system will be fully developed and numerous new features will be demonstrated. BCS will also demonstrate the operation of their 1100 and 800 systems by remote control.

There will be two new entries into the business automation field this year. Trace, Inc. and Automation Electronics, Inc. will be at NAB for the first time. Both

continued on page 128

DON'T BLOW IT...



Your station is too valuable to get knocked-off the air. You can't afford it. Power line pollution, transients, surges or lightning can blow you off the air. You may go down with a loud crack (like those 300 amp diodes pictured above) or just quietly die from endless pre-mature component failures.

Any way you look at it, we can help. Our 5 nanosecond response, non-arcing non-interrupting, solid state protection takes 105,000 watts of transient energy while you stay on the air . . . UN-INTERRUPTED. Solid state permanent (no spark-overs here), proven and patented.

Like some data and a list of satisfied broadcast users?
Call us — (213) 283-9278, ask for Mr. Smitter. He's your man for fast, straight answers.

TRANSTECTOR SYSTEMS
ABSOLUTE TRANSIENT PROTECTION
a division of Konic International Corporation
532 MONTEREY PASS ROAD, MONTEREY PARK, CALIF. 91754
Phone: (213) 283-9278

Or send for literature:
- ☐ UP-TO-DATE BROADCAST PROTECTION
- ☐ PLAIN FACTS OF CIRCUIT PROTECTION
- ☐ CIRCUIT PROTECTION DEVICES (Reprinted from ECN)
- ☐ ACP BRANCH SERVICE PROTECTION

Circle 184 on Reader Service Card

companies will exhibit radio broadcast business systems. Trace will feature its software package, a complete broadcast management system, and VIP, a hardware interface to radio automation systems. Automation Electronics features a complete in-house mini-computer system for radio stations "for under $30,000." The system, Autotron, is a "complete end-to-end" broadcast control system offering business programs and a technical interface as part of Autotron II. All together, Autotron is a "building block" approach with groups of features available in configurations from Autotron I through Autotron VI.

IGM/NTI of Bellingham, Washington, have added the new Model 755 to their series of computer-controlled automation systems. It uses dual DEC floppy disc drives.

TRI Will Offer Tri-Chroma Recording Technique

In the eyes of some, it's unfortunate that videotape recorders were perfected *after* the color compatible NTSC standard was already set. Coming as late as they did, VTR engineers had little choice but to accept the 3.58 subcarrier frequency and all its attendent problems—moiré, velocity errors, first line hue shifting, banding, etc. If VTRs were a reality earlier in TV's history, before NTSC composite encoding became common practice (and all production switchers were built to handle NTSC), the industry might have elected to stay with R G B signals alone. Indeed, very early in the game, cameras did feed separate R G B signals through R G B channels switchers direct to the transmitter.

It's not too late to rethink the problem and to adopt an alternative, says Robert Cezar, R&D head and chairman of the board of TRI. In fact, in 1975, at the NAB Convention in Las Vegas, TRI did indeed show a R G B system that made it possible to produce outstanding edited pictures on one-inch IVC machines. Two short years ago, TRI itself didn't think it could convince the industry to change its old ways—the most it hoped to accomplish at that time was to get engineers thinking.

But it is now 1977 and TRI says it's foolish to continue to put up with the short comings of NTSC at every turn. A lot of recording ought to be done *before* encoding says this young upstart company, and this year TRI will demonstrate a perfected Tri Chroma system with the expectation that production houses in particular will line up as eager customers.

Why? For one thing, the Tri Chroma system lends itself beautifully to shooting commercials along the single camera style. In fact, with Tri Chroma, one can shoot the same scene on different days with different lighting and match colors perfectly with a "painting" accessory. In a private suite at the SMPTE Winter Television Conference, San Francisco, TRI showed how to get superb color out of an Ampex 7900 machine. The company boasts it can get a 55 dB S/N ratio out of any recorder with its method.

How? By recording separately on tape the luminance (Y) and chrominance (R-Y/B-Y) signals. No 3.58 MHz sub-carrier is used during the recording process. With highband recorders, the normal carrier (7-10 MHz) contains the luminance information only, and at a lower spectrum on tape (2-3 MHz), the chrominance information is recorded. FM is used to record R-Y and B-Y information. These signals are recorded not simultaneously but sequentially in an alternate line fashion as in SECAM. By recording the Y information on the upper carrier and the R-Y/B-Y on the lower carrier, it is analogous to handling two monochrome (B-Y) signals on tape.

By definition, there cannot be velocity errors. Rotational inaccuracies result in time base errors only since frequency errors are meaningless in an FM system. Hue and saturation are derived from the R-Y/B-Y video signals as they relate to Y. Noise is reduced because there is no 3.58 MHz sub-carrier in the Y channel (7-10 MHz) making possible sophisticated noise reduction schemes. Head equalization in the Tri-Chroma system affects luminance resolution only thereby eliminating color banding.

To describe the Tri-Chroma concept another way, by avoiding putting the VTR after the color camera and coder and taking R G B directly, one obviates the need for such complicated solutions as velocity error compensators and super highband circuits with pilot to avoid moiré etc. Normally committing a signal to tape calls for a delicate manipulation of an intrinsic format and re-modulating it to suit the tape machine. By putting the VTR between the color camera and the encoder, all TRI has to do is insert one simple black box in the VTR's head signal path. Signals reaching the VTR are monochrome in nature unaffected by NTSC en-

Less costly than the earlier Model 770, the 755 gives fast access to eight days of programming with floppy disc storage, 2400 switching events per day.

Monitors everywhere

One of the more visible displays of video picture monitors will be Conrac's. Nearly 400 Conrac monitors will be used in various locations around the three hotels to carry closed circuit pictures of convention activities.

Moreover, 88 Model 6000 Master monitor units will be used by various other manufacturers in their displays and 93 units of the Model 5322, 19V professional broadcast type monitor will be in evidence. The Model 5322 is expressly designed for budget-limited applications in broadcasting and teleproduction.

World Video, Inc. will introduce two new high quality color video monitors. The CR6220 is a 12 in. color video

continued on page 130

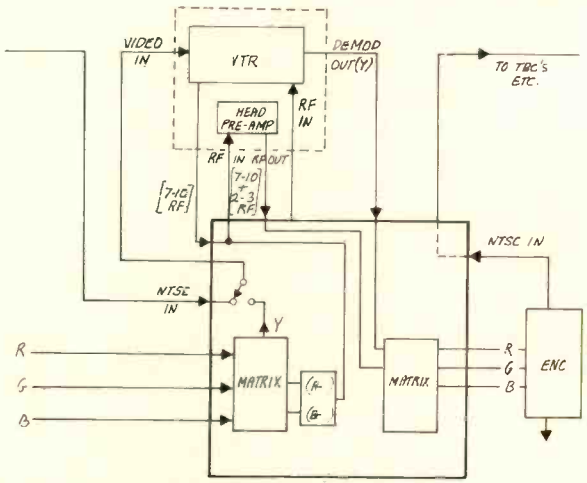
coders and interleaving.

Moiré problems so readily encountered in direct color systems with recorders operating at slower head writing speeds (with the carrier and deviation in the 4-6 MHz region) are circumvented because color information is recorded well below luminance information.

Alternate line recording of color difference signals is justified by the accepted bandwidth of the color signals. NTSC standards limit I&Q to bandwidths of 1.2 and .5 MHz respectively. Using a figure of 80 lines of resolution per MHz of bandwidth, the highest color difference resolution is 120 lines. Vertical resolution is not bandwidth limited being composed of 488 active scan lines. An alternate line system reduces the apparent vertical resolution to 244 lines, still twice the maximum horizontal resolution. This theoretical limitation of resolution, however, normally encountered in SECAM systems, can be dramatically improved through the use of a two-line delay, look ahead averaging system.

In the Tri-Chroma system, luminance is, as mentioned, the only signal in the highband area of 7-10 MHz. Given a highest modulating frequency of 4.2 MHz and blanking in the FM carrier as 8 MHz, the maximum excursion of the lower sideband will not fall below 3.8 MHz. Using 800 kHz of FM deviation to carry color difference information, TRI can put the color carrier around 2 MHz and not produce any sum or difference frequencies that will interfere with luminance. That is, a full "white" signal of any color difference (bandwidth set at 1 MHz) would be no higher than 2.8 MHz and produce sidebands no greater than 3.8 MHz. Thus luminance and chrominance carriers do no interact.

The accompanying block diagram indicates how the signals are routed between the camera and the VTR—and out of the VTR into an encoder for further signal distribution. The lower block is the TRI black box. It interfaces with the camera, the VTR and the encoder. The only modification to the VTR is to enter the signal path of the VTR heads at the RF path in and RF out



Tri Chroma black box takes RGB from camera and feeds it to VTR head in two bands: 7-10 MHz for Y and 2-3 MHz for R-Y and B-Y. Latter two are recorded separately in alternate fields.

points. After recording/playback, the signals are matrixed to produce composite NTSC.

TRI plans a number of accessories—the painting control unit mentioned earlier could be combined with a fader. With such a unit, and using TRI SUN code, a tape could be analyzed, enhanced or altered as desired and then, through the use of time code user bits, be programmed to be automatically corrected upon playback.

TRI has developed a spin-off from the Tri-Chroma called Tri-Chroma-4, designed specifically for color-under transports, to be exhibited at the NAB.

monitor for professional applications and the CR6220 RGB is a high resolution monitor. For the features included, these monitors are supposed to be relatively inexpensive. Tektronix will show a Model 650 A color video monitor with variable aperture correction and blue-only mode for determining chroma noise and banding in VTRs.

Monitoring Equipment, FM and AM

New FM monitors will be introduced by Belar Electronics Laboratories, Inc. The devices claim new standards for FM Stereo Monitoring equipment, featuring an absolute value modulation meter with a peak-catching circuit to display the true peaks of complex modulation. Two meters are included on the Stereo Monitor to provide the automatic measuring of stereo separation and crosstalk. Appropriate outputs are provided for use with ATS.

QEI, a fairly new entrant into the production of broadcast station equipment, will have their line of monitoring units. The Model 571 AM modulation monitor has separate meters for percentage of modulation and for carrier level, reads positive and negative peaks, has positive and negative peak flashers. The model 671 FM modulation monitor reads negative and positive modulation peaks, has an adjustable peak flasher and selectable tests for AM noise, FM noise, internal noise, RF level.

Test and measurement equipment for TV

Philips Test and Measuring Instruments, Inc. will introduce a new VITS automatic analyzer and synchronous demodulator. Telecommunications Industries Ltd., will show at NAB for the first time, an ENG/EFP two Chart System. The chart system has been designed to provide basic alignment registration, color balance, and auto-white balance information for fast set-up of ENG type cameras. The system consists of a Registration Chart and specially designed Color Balance Chart mounted on durable white acrylic plastic. The two charts are hinged together and are folded face-to-face when not in use. Protective coverings for storage and field use are supplied. Also at the show for the first time will be the Porta-Pattern Format BBC #61 Color Flesh Tone Reference.

A TV demodulator, VSD 3 by Barco, and a new Color Bridge Monitor will be shown by Rohde & Schwarz Sales Co. (USA) Inc. In addition, R&S will show their Audiodat System for monitoring FM and TV sound equipment. Another distributor, Television Equipment Associates, in addition to its other products, will have a new Matthew TV Line Selector, K-Set tape cleaner and evaluator for ¾ in. cassettes. The K-Set will clean and evaluate for physical damage, a 1-hour cassette in 4 minutes.

Tektronix is bringing out a couple of new products. A new Color Picture Monitor, 65-A, and a new Model 1450 Precision Demodulator.

3M, which we've heard from in some other areas, will

continued on page 132

YOU NEVER HAD IT SO EASY.

The things you're asked to do! Now that people have discovered how valuable and flexible video can be, there's no limit to the things they want you to do with it. Which creates some terrific opportunities...and more than a few production problems as well. At Cine 60, we're specialists in designing new products to help you get more of the former. With less of the latter.

Take power, for instance. Our rechargeable Powerbelts mean you *can* take it with you. More ampere-hours than ever before. Evenly distributed around your waist to give you the same kind of mobility TV film cameramen have relied on for years. Our fast-charge versions are at full capacity in just one hour, to give you more shooting and less waiting. □For more light on the go, compact Cine 60 Sun Guns fill the bill. Color-balanced for video, they give you lots of fresnel-soft lumens in the smallest spaces. Plus wide angle and focusing, too □And if you prefer your Sun-Gun power packaged differently, we can give you Cine 60 NiCad reliability in a Powerpak/Sun Gun combination. □Our rechargeable Powerpaks are also available separately. In a variety of sizes, voltages and capacities to power just about anything you have in mind. Video. Audio. You-name-it. Just slip it on your belt or into a pocket...and go! □While our rugged, reliable power systems take a load off your mind, we can take a load off your shoulders, as well. With a complete line of comfortable shoulder pods and body braces that let you concentrate on what you're shooting...instead of your aching sacroiliac. Whatever the configuration of your camera, we've got a pod to match. □Cine 60 has a lot of other valuable tools to make life easier for video people. Like our Snaplok, to let you snap-on, snap-off cameras and other equipment from tripods, stands, pods, etc.—in less time than this sentence took to read. Plus suction mounts, compact quartz lighting... and that's just the beginning. With all the things you're asked to do these days, it pays to have all the help you can get. Why not call or write for our catalog today?

CINE 60 I
INCORPORATED
Film Center Building/630 Ninth Avenue
New York, N.Y. 10036/Tel: (212) 586-8782

Circle 188 on Reader Service Card

also have a Model 6220 In-Line Image Enhancer which will enhance NTSC color video output from a camera or VTR and features an alternate output suitable for chroma-key use. Leitch Video will have four new products in the video field, a color black Assignment Switcher, a precision Impulse clock, a PAL Synchronizing Pulse Generator, and a remote Synchronizing Code System.

Datatek Corp. will show a D-629 Video Sweep Generator and Tentel has a new T2-H15-U Tension Gauge designed for the Sony VO-2850 and other U-type cassette machines.

Other new products for TV at this year's NAB

Colorado Video Inc. will add to its line of video manipulation tools with the Model 275 Video Expander with solid-state memory. Combined with their 260B, the new product will be called the Compressed Video System. Townsend Associates, Inc. is showing a new IF modulated TV exciter and Cine 60 has a new line of Portable Solar Generators. The generators come in a suitcase type carrying case and generate 12V for charging batteries and powering low current drain 12V devices.

Garner Industries has developed a high speed bulk eraser for video cassettes that utilizes a conveyor belt design. Memorex Corp. will have a complete line of audio and video tape products, including MRX 716 Quantum videotape and MRX 714 videotape for the IVC 9000 VTR. Fuji Video Tape will also have some new products such as a Fire Retardant Shipper, High Performance Mastering Video Tape, a mini cassette for portable U-Matic® recorders, high energy 1-in. videotape and Pallet Stock videotape.

Consolidated Video Systems, Inc., in addition to its other TBCs, will be showing a CVS-15 Digital Time Base Corrector for the PAL-M market. Micro Consultants Inc./Quantel will present a Time Base Corrector with digital picture processing and manipulating features. NEC America has added to its line a new digital TBC for broadcast, the NTC-5000.

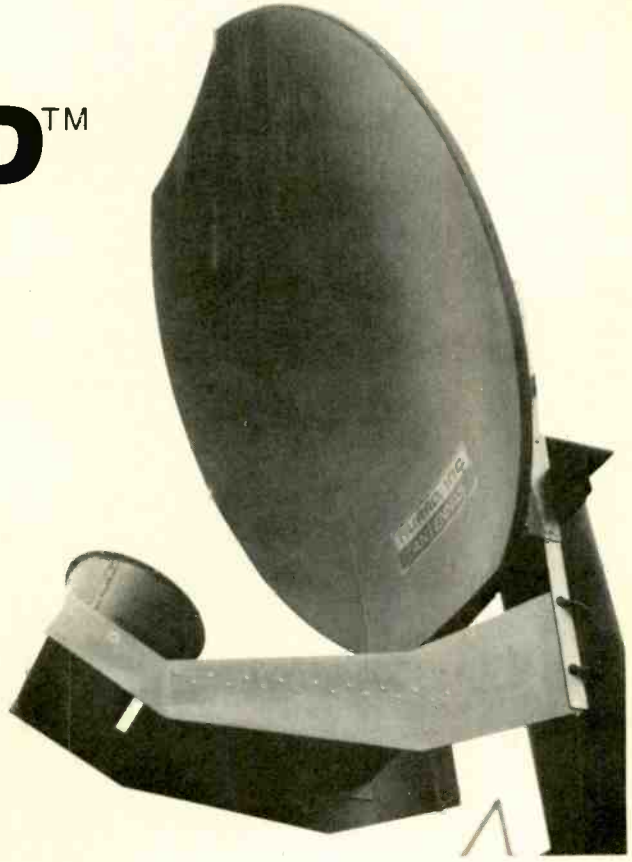
Spindler & Sauppe, Inc. will show the Producer 32 TV Filmchain Slide Projector for the first time. The Producer 32 is the first filmchain slide projector to incorporate microprocessor control. By itself, the Producer 32 can automate slide dissolve presentations from a single port of a single multiplexer. The machine features, in addition to microprocessor control, 16 different dissolve rates, left and right crawls, high random access and a 451 cue electronic memory. A forty-six button, rack mounted controller remotes all projector functions to the control room.

Lipsner-Smith Corp. will display a new Retec 16mm Previewer for the first time at NAB and BJA Systems, Inc. will demonstrate for broadcasters at the NAB their new Natural Coloring Process which colorizes black & white film prints during the film to video transfer to give them new life. The Camera Mart, Inc. will be at their booth explaining some new short- and long-term rental programs for video and ENG equipment.

continued on page 134

ENHANCE YOUR ENG/EJ OPERATIONS WITH THE NEW NURAD MODEL 20 SQ1 SUPERQUAD™

MICROWAVE ANTENNA SYSTEM



- ★ **HIGH GAIN (23dBi)**
- ★ **QUAD POLARIZED**
- ★ **LOW SIDELOBES**
- ★ **PAN ONLY**
  (No tilting required)
- ★ **DIGITAL CONTROL**
  (Remote operation optional)
- ★ **RADOME ENCLOSURE**

The 20 SQ1 SUPERQUAD™ was developed as a companion to the 2 GHz 20 QP1 QUAD, the "standard" receive antenna system in the United States, now in everyday use for live ENG/EJ operations at some 100 stations. By rejecting such multipath effects as ghosting or smearing and affording the operator the ability quickly and simply to obtain the optimum received signal through a selector switch, quad polarization maximizes the prospects of successful, high quality pickups.

The radome-enclosed 20 SQ1 SUPERQUAD™ enhances your ENG/EJ operations by providing line-of-sight coverage greater than triple the range of the 20 QP1 without increase in transmitter power. With its narrow beamwidth it minimizes the possibility of interference, while, with its CSC^2 elevation beam-shaping, coverage is assured from locations virtually underneath the antenna without elevation tilting. Thus the 20 SQ1 antenna need only be panned through its built-in rotating pedestal.

The operator is provided a control panel for polarization selection and panning. Optional digital remote control, including automatic features such as preselection of polarization and readout of azimuth angle and polarization mode, is also available.

See the SUPERQUAD™ at NAB Booth 230, Sheraton Park Hotel, Washington, D.C., March 27–30, or contact Nurad directly.

NURAD, INC.
ANTENNAS

(301) 462-1700

2165 Druid Park Drive Baltimore, Md. 21211

Circle 190 on Reader Service Card

Station Master.

You can virtually drive coast-to-coast without leaving the sound of a radio station using a Shure microphone. In fact, you'll encounter almost as many different models of Shure microphones as you will states.

Case in point: the Shure SM7. It features a wide-range, ultra-smooth frequency response with show 'n' tell switches that allow the user to select any of four microphone response curves: (1) flat response; (2) presence boost; (3) bass rolloff; and (4) presence boost with bass rolloff.

The SM7 also uses an innovative "air suspension" integral shock mount for super-isolation against mechanical and shock noise.

Ask your Shure dealer for a demonstration of the show 'n' tell SM7. It's one Shure "show" worth telling everybody about.

Shure Brothers Inc.
222 Hartrey Ave., Evanston, IL 60204
In Canada:
A. C. Simmonds & Sons Limited

TECHNICORNER
The Shure SM7 is a unidirectional dynamic microphone with a 40 to 16,000 Hz frequency response. Noise reduction systems cut mechanical noises, breath "pop," wind, and electromagnetic hum. "Add-on" filter devices are unnecessary. The SM7's integral foam wind/"pop" filter reduces even difficult close-up breath sounds. Impedance is rated at 150 ohms for microphone inputs rated from 19 to 300 ohms. Output level: −57 dB (0 dB = 1 milliwatt per 10 microbars); open circuit voltage: −79 dB (0 dB = 1 volt per microbar).

SHURE®

MANUFACTURERS OF HIGH FIDELITY COMPONENTS, MICROPHONES, SOUND SYSTEMS AND RELATED CIRCUITRY.

Circle 191 on Reader Service Card

Complete Listing of 1977 NAB Exhibitors

The following is based on material as of late February. Booth numbers may be changed slightly in some cases. A quick guide to the hotels is as follows: Sheraton Park—100-300's SP, Washington Hilton—400's WH, and Shoreham—500-700's SH.

Acrodyne Industries, Inc. (Booth 202-SP)

Will introduce a 6-kW visual, 600-watt aural **TV transmitter,** externally diplexed. Also: line of lower powered TV transmitters and translators.

A.F. Associates Inc. (Booth 224-SP)

The **AFR-1200 system** will be shown which is an Ampex 1200 VR 1200 repackaged with a CVS 520 TBC with both taking less space than the old VTR.

Alford Mfg. Co. (Booth 212-SP)

Will show **antennas for FM, TV, microwave; diplexers, RF loads, RF switchers; transmission line and line accessories.**

Amco Engineering Co. (Booth 308-SP)

Will show **new color and styling** for racks, consoles and instrument enclosures.

American Data Div., Airpax Electronics (Booth 101-SP)

New for NAB will be the Models 558-1 and 558-2 **video production switching systems;** and the 2100 **series production switchers.** Also shown: other production and distribution switchers.

American Electronic Labs. (Booth 216-SP)

Will show AM and FM **broadcast transmitters, exciters, stereo generators.**

Ampex Corp. (Lincoln & Monroe Rms.-WH)

Will show a **full line of broadcast equipment:** video tape recorders, audio recorders, cameras, magnetic tape etc. The Electronic Still Store system is expected to be on display.

Ampro Corp. (Booth 300A-SP)

Will introduce MonoMax, a record/playback **matrix system that guarantees a perfect mono sum signal from stereo reels and carts.** Also showing complete studio systems; consoles; cart playing equipment; turntables.

Andrew Corp. (Booth 523-SH)

Will emphasize Heliax **cables;** STL microwave **antenna systems;** and earth station antennas.

Angenieux Corp. of America (Booth 402-WH)

Full line of lens will be shown. Feature attraction is a new **42X continuous telephoto zoom** for field applications and another for studio use. A 15 × 9.5 total lens system for ENG color cameras will be shown.

Anixter-Mark (Booth 569-SH)

Will show **microwave antennas and accessories;** point-to-point and two-way antennas.

Arvin/Echo Science Corp. (Booth 536-SH)

Will introduce an EFS-1, Frame-Stor® **controller.** Also showing standard line of portable video tape recorder/reproducers.

Asaca Corp. (Booth 424-WH)

A new **backpackless portable ENG camera** will be unveiled. Also shown will be test equipment: a **video noise meter** and **envelope delay measuring instrument.**

Audi-Cord Corp. (Booth 565-SH)

Showing for the first time the new **Modu-Cart multiple transport cart reproducer,** with four transports as a single audio source, playable random access or in automatic sequences. Also a complete line of cart accessories.

Audio Designs and Mfg. Co. (Booth 430-WH)

Will show their line of **broadcast audio consoles.**

Audio Sellers Inc. (Booth 607A-SH-A)

Will show the **"Money Machine sales/production library and the new "Music Explo" production library.** The latter has a total of 400 music beds, and is available on a "buy out" basis for radio and TV.

Auditronics Inc. (Booth 435-WH)

Will introduce Model 110V **audio production console.** Also showing their line of audio consoles; line amplifiers; and equalizers.

Automated Processes, Inc. (Booth 517-SH)

Will unveil a new series of **consoles** for broadcasting and production, with emphasis on automation, and a new family of **audio amplifiers** and **intercom systems.**

continued on page 137

Be a double winner

WIN

a Datatron $7,600* TEMPO 76 Editor

NAB Convention, Booth 531, Shoreham Hotel

It's easy to be a winner twice.

First, by stopping at our booth and taking a close look at several Tempo 76 Editors in operation.

Second, by entering your name in the drawing (at any time during the show) which will be held at noon on March 30th for the system on display. You need not be present to win.

You'll have a chance to actually use the Tempo 76 at the show; try it out, put it to the test. We know you'll be impressed with its speed, accuracy, expandability and versatility. The Tempo 76 offers you two editing technologies for the price of one in a single package—the only editor to do so. You can start with Control Track then convert to SMPTE at any time without obsoleting your initial investment.

Remember: Booth 531, Shoreham Hotel, a chance to be a double winner.

*Includes Tempo76 Editor and electronic package to operate two VTRs for Control Track or SMPTE Time Code editing. Interfacing for either system available at a nominal charge. To be eligible, winner must now be employed in broadcast, industrial or educational TV.

Datatron, Inc.

EDITING SYSTEMS DIVISION

1562 Reynolds Avenue • Irvine, CA 92714 • (714) 540-9330 • TWX 910-595-1589 • Cable RELIABLE
Eastern Regional Office: 505 White Plains Road • Tarrytown, NY 10591 • (914) 631-4060

Circle 193 on Reader Service Card

Automation Electronics Inc. (Suite M-390-SP)

Will introduce Autotron, **in-house mini-computer** for traffic, billing, bookkeeping, automation control, and ATS logging.

BJA Systems, Inc. (Booth 572-SH)

Showing for the first time at NAB a **new coloring process for converting black and white to color,** using electronic color generation and computer animation.

Beaveronics, Inc. (Booth 610A-SH)

New products for NAB are Models 154 and 156 **production switchers.** Also shown will be other video switching systems, selected terminal equipment, Favag clocks.

Belar Electronics Labs. Inc. (Booth 317-SP)

Will introduce a **new line of FM monitors.** Also displaying AM monitoring equipment and FM monitoring equipment.

Berkey Colortran (Booth 507-SH)

Will introduce **10-in. Fresnel, 6-in. Fresnel, Memory II, New Dimmer Module (CRD-B).** Also exhibiting: new TV lighting equipment and electronic lighting control systems; and a new accessory line.

Beston Electronics Inc. (Booth 504-SH)

Will show model 709-A **automatic light control** for large image film chains.

Bird Electronic Corp. (Booth 311-SP)

Will show for first time the Model 3170 **high-speed "Wattcher" monitor control** for remote or on-site supervision of transmitters. Exhibit will include live demonstration of measurement and monitoring of transmitter remotely, with RF power feed from adjacent transmitter exhibit.

Bosch-Fernseh (Booth 413-WH)

Feature attraction will be **BCN series one-inch professional quality VTRs.** New portable BCN 20 will be shown. Complete line of studio and portable cameras will be shown.

Boston Insulated Wire and Cable Co. (Booth 108-SP)

Cables and connectors for TV camera systems will be shown.

Broadcast Electronics, Inc. (Booth 206-SP)

Will show **complete operating control rooms;** also their 3000, 4000, and 5000 series of single and multiple cart record/playback equipment; four, five and eight-channel consoles; FM-601 stereo AGC-limiter, AM-400, AM limiter.

New compact Otari Mark II recorder.

Listec's Vinten PortaPed.

CCA Electronics Corp. (Booth 201-SP)

Will introduce the **new 10E, 10-watt educational FM transmitter; the FM-4000-E, a new 4-kW broadcast FM transmitter; and the FM-55000-EP, a new 55-kW FM broadcast transmitter.** Also emphasized in display will be the CCA modular audio consoles; the CCA "Optimod" FM limiter; the TA-55-BT, 55 kW UHF tv transmitter; and a line of FM antennas, including CP models.

CSI Electronics, Inc. (Booth 309-SP)

New product will be a 250-watt **all solid state FM transmitter.** Also shown will be the complete line of other AM and FM transmitters.

CMX Systems (Booth 226-SP)

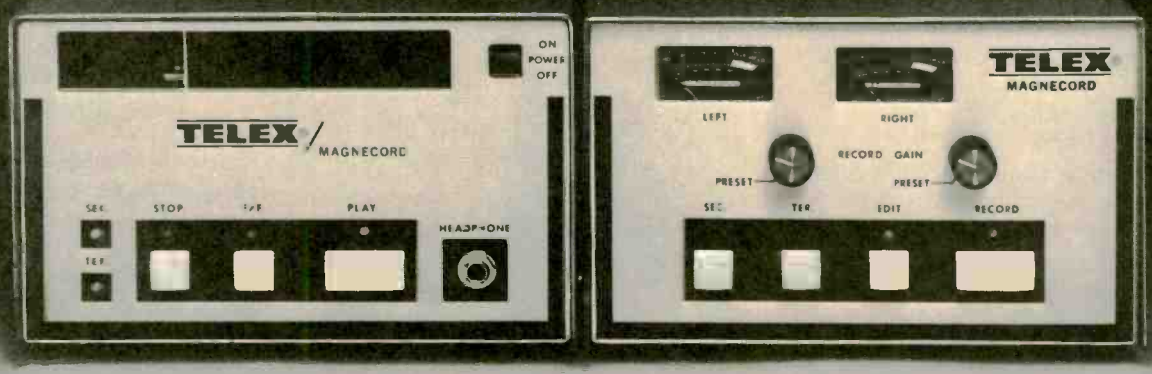
Computer assisted **video tape editing** will be featured using the CMX-340X. Users will show how it is done.

Cablewave Systems, Inc. (Booth 518-SH)

Will show their line of **transmission lines** and line connectors; microwave antennas; transmission line pressurizing equipment; waveguide and waveguide accessories.

continued on page 139

At Last, a Cart Machine that keeps its cool



Telex/Magnecord broadcast cart machines run cool and steady. So cool no ventilation is required, so steady not even voltage or frequency fluctuations will alter their speed. Thanks to our dc servo flutter-filter drive.

The MC series offers broadcasters a host of options, including field convertability from mono to stereo or play to record and, of course, end of message, secondary/tertiary cue tones.

Designed for type A or B carts, the MC series meets all NAB specifications, offers full immunity to EMI and RFI, is remote controllable and automation compatible with CMOS digital logic. Audio muting, air damped low voltage dc solenoid and fast forward are standard features on every MC unit.

Eight broadcast cart machines to choose from in the Telex/Magnecord MC series. Running cool and steady. With a pleasant surprise—they're affordable.

For detailed information please write:

PRODUCTS OF SOUND RESEARCH

TELEX®

COMMUNICATIONS, INC.

9600 ALDRICH AVE. SO. • MINNEAPOLIS, MINN. 55420 U.S.A.
Europe: 22 rue da la Legion-d'honneur, 93200 St. Denis, France
Canada: Telak Electronics, Ltd., Scarborough, Ontario

Circle 195 on Reader Service Card

NAB '77

California Switch and Signal Co. (Booth 607-SH-A)

Will show **patch panels and switching equipment,** including Switchcraft pushbutton single and multiple switches; also Belden cable.

Camera Mart (Booth 505-SH)

Full line of **video and film equipment** for rent.

Canon USA Inc. (Booth 301-SP)

The ultimate **studio zoom lens** is the boast. New product will be a PV25X20B, 25 to 1, f1.8-3.0 lens. Broad line of compact very fast lens will be shown.

Capitol Magnetic Products (Booth 313-SP)

Will feature **Audiopak A-2 broadcast cartridge.** Also showing: Q-19 backcoated studio mastering tape; Q-15 low noise and 2 mil low noise/low print tape.

Ceco Communications Inc. (Booth 204-SP)

Will feature **electron tubes** for transmitters TV/radio; also camera tubes.

Central Dynamics Corp. (Booth 104-SP)

Wi l introduce the new **CD480 video production switcher** with sequential effects amplifier; and the **System 100 master control automation** interfaced to BIAS business automation.

Cetec Broadcast Group (Jampro, Schafer, Sparta) (Booth 227-SP and 417-WH)

Will show **new audio consoles and CP antennas for TV;** also cartridge players, consoles, mixers; automation equipment for radio; FM transmitters and AM transmitters.

IGM's 755 automation system.

Berkey's 10 in Fresnel.

Datatron's Tempo 76 Editor to be given away.

Christie Electric Corp. (Booth 433-WH)

Will show Christie's REFLEX-20 **charging system,** 15-20 minute chargers and sealed cylindrical nickel-cadmium battery packs for ENG.

Chyron Telesystems (Booth 303-SP)

Will exhibit **graphic capabilities of Chyron II and Chyron IIIB;** also showing character generators.

Cine 60 Inc. (Booth 443-WH)

This firm will show a new line of **portable solar generators** for charging 12-volt batteries and powering low-current, 12-volt devices. Also in the display will be accessories for ENG and field production systems, including battery belts and packs, shoulder pods, Snaploks, and Soft-Lite 350-watt Sun-Guns.

Cinema Products Corp. (Booth 503-SH)

A new universal **Steadicam stabilizing system** will be the highlight. Full line of CP-16 and CP-16R news film cameras will be shown.

Collins Div., Rockwell Intl. Corp. (Booth 217-SP)

Exhibit will include a live studio with **new consoles and full chain of audio equipment** from a multiplicity of Collins vendors, all the way to off-air monitor. Introduced will be **two new transmitters,** an AM and an FM, **new stereo console,** and **two new FM antennas.**

Colorado Video, Inc. (Booth 437-WH)

Will show for first time the **Model 275 video expander,** with solid-state memory. Along with the Model 260B video compressor, the 275 will be demonstrated in a complete system for narrow-band video.

Comark Industries (Booth 614-SH-A)

On display will be their line of **RF amplifiers and switchers,** transmission line and connectors; demodulators; modulation monitors; VITS and

continued on page 141

Q: Why do ENG cameramen wear Frezzi-Belts™?

A: To keep their hand-held video cameras from running down!

"Shoot all day without the need of any external power source." **Frezzi-Belt™ battery packs** will run your **RCA TK-76,** or **Ikegami HL-77** or **37,** or **Hitachi * SK-80 (and others)** about **3** hours, or power **Sun Gun** or **Mini-Pro** lights. Up to 5 belts recharge automatically (hands-off) on Frezzi Sequencer Charger, in sequence. For information: **(New Jersey 201) 427-1160** or **(New York 212) 594-2294.**

** Hitachi Belt available only from Hitachi Denshi America, Ltd.*

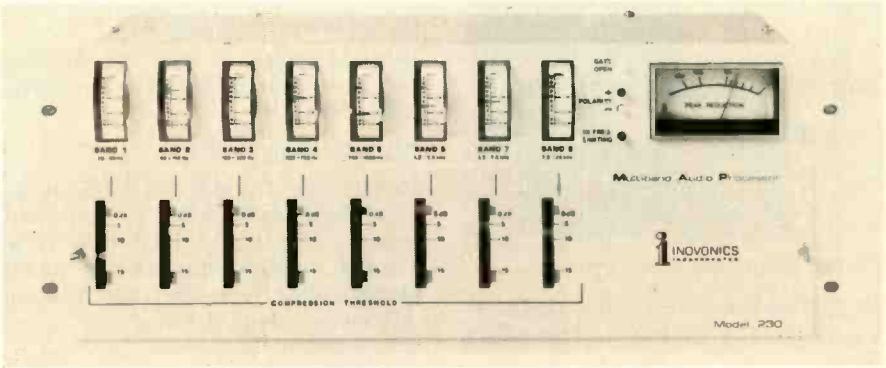
See Frezzi equipment at NAB Camera Mart Booth 505 Shoreham.

™
Frezzolini E.N.G. support equipment.

Frezzolini Electronics Inc.
7 Valley St. Hawthorne, N. J. 07506 USA

MADE IN U.S.A.

Circle 197 on Reader Service Card



New Inovonics Model 230 8-band audio processor.

VIR systems and equipment.

Commercial Electronics Inc. (Booth 222-SP)

Big feature will be a new **modularized field portable studio camera line,** the CEI 300. Two different head designs for ⅔-in. and one-in. tubes are available. Other studio cameras and also image enhancers will be shown.

Communications Technology, Inc. (Booth 559-SH)

New products will be the **40X series of routing switchers, the ENG1000 assignment switcher** and the **3300 production switcher.**

Computer Image Corp. (Booth 415A-WH)

Will show their **animation equipment;** and **large and small video production and routing switchers.**

Computer Magnetics Corp. (Booth 535-SH)

On display will be their **refurbished video and audio magnetic heads;** also video discs, color correctors, video equalizers.

Comrex Corp. (Booth 570-SH)

Will feature **remote broadcast audio transmission / communications / control.** Also showing: remote broadcast cue systems, wireless microphone systems, TV aural monitors, remote pickup transmitters and receivers, speech processing equipment.

Conrac Div., Conrac Corp. (Booth 404-WH)

Will introduce the **Model 5322, 19V professional broadcast type monitor.** Also on display will be the Model 6000 Master monitor.

Consolidated Video Systems Inc. (Booth 224-SP)

Will introduce the **CVS 515 Digital Time Base Corrector** for the PAL-M Market. Also showing its standard line of time base correctors, field synchronizers, and video compressor.

Continental Electronics Mfg. Co. (Booth 220-SP)

Will show their line of AM **transmitters, AM antennas, diplexers** and **RF loads.**

Convergence Corp. (Booth 509-SH)

On display will be **video editing control systems.**

Cox Data Services (Booth 407-WH)

Computer **data processing systems** for TV, AM and FM broadcast station and cable systems.

Data Communications Corp. (Bias) (Booth 422-WH)

Will demonstrate for the first time an **automatic switching system** by interfacing with two vendors, CDL and Vital. Also showing computer service for sales, traffic, and operational accounting for TV and radio.

Datatek Corp. (Booth 553-SH)

Will introduce **D-629 Video Sweep Generator,** and **D-400 30 × 10 Video Audio Routing Switcher.** Also showing its standard line of routing switchers, and video test equipment.

Datatron Inc. (Booth 531-SH)

Will be showing **Tempo 76 editors** adaptable to both pulse counting and SMPTE time code. Highlight will be drawing for a free Tempo 76.

Delta Electronics, Inc. (Booth 300-SP)

Will introduce the Model OTB-3, TCA-N-EX, and TCA-N-EXR series of **RF ammeters** equipped with output provisions for direct attachment of remote reading meters. Will also introduce **ATS equipment,** show complete line of antenna monitors, test instruments and control devices.

Dielectric Communications (Booth 544-SH)

RF instruments, waveguide and accessories, RF switching, switching automation, and test equipment.

continued on page 142

IVC's Chromacon VTR.

Digital Video Systems (Booth 513-SH)

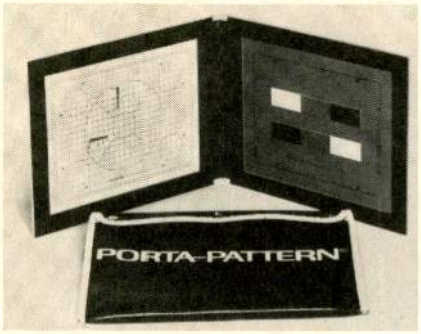
Will demonstrate a **4 x sub carrier TBC** with full velocity correction, and some hardware from digital special effects line.

Di-Tech Inc. (Booth 109-SP)

Will introduce Model 5400 **Audio Follow Video Routing Switcher.** Also showing their standard line of: video and pulse distribution amplifiers; passive video switchers; and audio monitor amps.

Dolby Labs. (Booth 602A-SH-A)

Will show **new FM reception equipment** by various manufacturers incorporated Dolby decoding; also showing the Dolby **FM broadcast encoding units.**



Porta-Pattern ENG/EFP alignment.

Drake-Chenault Enterprises, Inc. (Booth 613-SH-A)

Demonstrating new **"beautiful music" format** for syndication; data on other program formats.

Duca-Richardson Corp. (Booth 529-SH)

Will introduce a new **video production switching system.**

Dynair Electronics, Inc. (Booth 403-WH)

Will introduce **new series 5900 audio distribution amplifier, Model AD-5980A;** and various remote control options for audio and video switching. Also showing line of routing switchers, production switcher (small), master control switcher, and remote control equipment.

Dynasciences (Booth 426-WH)

Will introduce a **new production switcher and special effects generator.**

ESE (Booth 557-SH)

Introducing to NAB an **ATS clock, clock-timer with memory, hand-held time calculator, SMPTE time code reader, console-mounting serial slaves.** Will show other time reading and measurement devices.

Eastman Kodak Co. (Booth 405-WH)

Will show **film** for ENG applications: **cameras, projectors, film processors.**

Eigen Video (Booth 563-SH)

Will introduce **slow-motion, instant-replay, color video disc recorder** (20 seconds). Also showing line of color disc recorders.

Electro Impulse, Inc. (Booth 568-SH)

Will introduce a **new dry load** for FM to 10 kW. Will also show the line of dummy loads for broadcasters.

Electro Voice, Inc. (Booth 546-SH)

Will have on display products from their extensive line of **microphones** and **loudspeakers.**

Electrohome, Ltd. (Booth 512-SH)

Color and monochrome **video monitors** will be on display.

Electronics, Missles & Communications Inc. (Booth 110-SP)

Will introduce several items: **low noise MDS preamp;** high performance **television translator; TV translator with SAW filtering;** and **backpack portable TV transmitter.** Also exhibiting MDS television transmitter, EMCEE model TTS-10E-M.

Farinon Electric (Booth 502-SH)

Will introduce an FM "mini-link" **Miniature Portable Microwave for 2 and 13 GHz bands.** Also will be featuring ENG equipment.

Fidelipac (Booth 218-SP)

Will show a **"major improvement in cartridge technology."** Will also introduce a new wow and flutter meter, and will show their line of cartridges for broadcast use.

Filmways Radio (Hamilton Room-SP)

Will show **syndicated programming for radio,** including the "20/40" format, and the twice-daily news show with Robert W. Morgan. Exhibit will

continued on page 144

Would you believe it? A Scully at $1200!

The newest from Scully! It's the 255 Reproducer,* providing 'round the clock quality for automated broadcast stations... and at only $1995, meet the new Scully 250 Recorder/Reproducer.*

The 250 and 255 professional performance specs mean you get the most for your money... dependable Scully performance and quality, built in, at very affordable prices.

See them. Hear them. You'll appreciate the value—from Scully, the leading supplier of broadcast recorders.

Sales, service and replacement parts are available worldwide from over 200 distributors. Contact Scully Recording Instruments, Division of Dictaphone Corp., 475 Ellis Street, Mountain View, California 94043 (415) 968-8389 TLX 34-5524.

Scully
Recording Instruments

*See them at the NAB Show, Booth No. 316

475-M Ellis St.

Circle 200 on Reader Service Card

include "sound chamber" chairs for relaxed listening to programs.

Flash Technology Corp. (Booth 554-SH)

Will introduce a new **control isolator for lighting systems** on "hot" antenna towers. Will emphasize also the FTB-205A Electroflash beacon system.

Fuji Video Tape (Booth 225-SP)

Will introduce a high-performance **mastering video tape,** a mini cassette for portable U-Matic recorders, high-energy 1-inch video tape, pallet stock video tape; and a fire retardant shipper.

Fujinon Optical Inc. (Booth 428-WH)

A **new field lens for sports coverage** will be shown. This 30 × 20 ESM covers more focal lengths than others. A new **14 × 10 f1.9 lens for ENG** with built-in 2X extender will be shown.

GTE Sylvania, Inc. (Booth 302-SP)

Theater and TV **studio lights** and **lighting accessories.**

Garner Industries (Booth 616-SH-A)

Will introduce a new **high-speed bulk eraser** for video cassettes, with conveyor belt design. Also displaying conveyor erasers for open-reel tapes.

Gotham Audio Corp. (Booth 527-SH)

Will introduce to NAB the AEG-Telefunken **C4 noise reduction system** for recording production; also the Woelke 3rd-harmonic' distortion meter; the Neumann rumble meter; the EMI QC production flutter meter.

The Grass Valley Group, Inc. (Booth 209-SP)

Will show for the first time **1600-7K Switcher with Digital Video Effects,** M200 TV Automation, 1600-1L Switcher. Also showing: frame synchronizers; routing switchers; switching automation; production switcher (large and small); and master control switcher.

Harris Corp., Broadcast Products Div. (Booth 205-SP)

Introducing the **BT-25L2, a new IF modulated TV transmitter;** the MW-1A, improved version of the all-solid-state 1 kW AM; the MW-5A and MW-50A, **new 5 and 50 kW AM transmitters with pulse duration modulation and built-in audio processing; the new FM-215 K and FM 20K, 2500 and 20 kW FM transin audio processing; the new FM-215 K and FM 20K, 2500 and 20 kW FM transmitters with a new exciter using digitally synthesized modulation.** Also introducing: the MSP-100 (Maximum Signal Processor) a **triband automatic gain control system with automatic attack and release times; an automatic transmission system (ATS) will be demonstrated.** The exhibit will also include an operating TV studio with two TC-80 live color cameras, two TC50A live color prism cameras; there will be another TC-80, with Triax, on the roof to feed monitors on exhibit floor. Also on display: the TF-100 automatic film camera, in operation; two System 90 automation systems, with new portable control. Also: a high-power FM antenna; line of FM monitoring equipment; the Gateway 80, Stereo 80 and Mono 5 and Stereo 5 audio consoles; and the Criterion cart equipment.

Hitachi Denshi America Ltd. (Booth 228-SP)

Major attraction will be a new **3-tube compact self-contained camera weighing less than 16 lbs.** Feature is auto white and black balance using digital memory. This new FP-1020 will sell for less than $20,000. The exhibit will include a full display of cameras

continued on page 146

It's a very good year...

to buy Belar.

There were always lots of good reasons to buy Belar . . . now we can give you many more. Like our new automatic Stereo Monitor, shown above.

We're introducing a line of new products that will set new standards of performance in broadcast monitoring. Each piece of equipment has been Belar-engineered to remain state-of-the-art for years to come. And, of course, our monitoring systems are suitable for ATS.

Check our new equipment and see why we say this is a vintage year. Buy Belar today . . . in ten years, you'll still be thanking yourself.

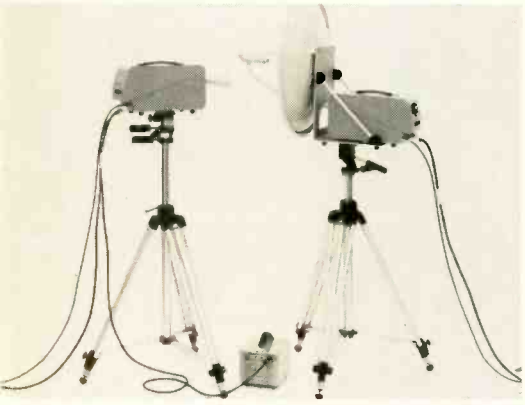
- Our new **FM Modulation Monitor** features a sample-hold and absolute magnitude peak detector circuit to capture and display all the program peaks on the modulation meter.
- Our new **Digital FM Modulation Monitor** features a continuous LED display to instantaneously indicate program peaks.
- Our new **Stereo Monitor** features two sensitive auto-ranging voltmeters for simplified automatic measurement of stereo separation and crosstalk.
- Our new **SCA Monitor** features an auto-ranging voltmeter for simplified SCA measurements.
- Our new **Digital FM Frequency Monitor** includes off-frequency alarms for carrier, 19 kHz pilot, and SCA frequencies.
- Our new **FM RF Amplifier** maintains full stereo performance with the ability to select any channel.
- Our new **Digital Clock** provides the necessary timing function for ATS.
- Our **AMM-2 AM Modulation Monitor** features three peak lights and outputs for ATS modulation control.
- Our **AMM-3 AM Modulation Monitor** features separate meters and four peak lights for negative and positive modulation, and also includes outputs for ATS modulation control.
- Our new **AM Frequency Monitor** includes ±10 Hz and ±20 Hz off-frequency alarms, and a loss-of-count alarm.
- Our new **AM RF Amplifier System** permits reliable monitoring with our new shielded loop In a field of 50 microvolts per meter.
- Our new **Automatic Power Controller** provides power correction and alarms for ATS.
- Our new **Mod-Minder** provides automatic modulation control and alarms for ATS.
- Our new **Status Alarm System** starts with two statuses and can be expanded to over 900 statuses.

BELAR ELECTRONICS LABORATORY, INC.

LANCASTER AVENUE AT DORSET, DEVON, PA. 19333 • BOX 826 • (215) 687-5550

When Accuracy Counts . . . Count on Belar

Circle 202 on Reader Service Card



New mini-links from Farinon.

and Saticon tubes.

IGM/NTI Corp. (Booth 538-SH)

Will introduce the new Model 755, **computer controlled automation system, and also the "Magna Carta," multicart system giving rapid random access to up to 1000 carts.** Also showing the line of other computer-controlled automation systems, the "Instacart" multicart systems, and the Mark VII sequencer.

Industrial Sciences, Inc. (Booth 552-SH)

Will introduce the ISI Series **Television Audio Console** and ISI Model 821 **Master Control Switcher.** Also featuring ISI 1200 Series Video Production Switcher, and standard line of: chroma keyers; amplifiers; production and routing switchers; generators; colorizers; automatic telecine light control; and signal equalization system.

Ikegami (Booth 508-SH)

A new **one-inch Plumbicon HK 357 studio and field camera** featuring triaxial cable will be unveiled. Other cameras on display will include the HL 37 and 77 series and a one-inch portable HL-51 triax type.

Innovative Television Equipment (Booth 310-SP)

Feature products will be a new model LTE-T2 **tripod** and LTE-H9 **hydro head** for support of ENG cameras. Full line of camera supports will be shown.

Inovonics, Inc. (Booth 571-SH)

Showing at NAB for first time their new Model 230 **eight-band audio processor** for AM and FM broadcasting. Also showing other processing equipment.

Interand Corp. (Booth 560-SH)

Will show the **"Star Probe" system** for interactive TV programming via cable or video cassette. It uses the new Telestrator electronic graphic system with selective erase and write through cursor mode, and the Mark II symbol control.

International Tapetronics Corp. (Booth 229-SP)

Will present its entire line of **premium and economy cartridge machines;** and the 750 and 850 series of audio **reel-to-reel equipment.**

International Video Corp. (Booth 401-WH)

Will introduce the **BCN one-inch VTRs** and the **IVC one-inch Chromacon VTRs.** Will have a broadcast teleproduction center with live demo of the 9000 automated editing system, and camera/recorder state presentation highlighting the IVC-7000P camera and BCN recorders.

JVC Industries Inc. (Booth 530-SH)

New handheld ENG camera will be unveiled. Professional ¾-in. portable VTRs and editing VCRs will be highlighted.

Jefferson Data Systems (Booth 429-WH)

Will feature end-to-end **business automation system** for small, medium and large market broadcast stations. Utilizes distributive processing system with microprocessing equipment on-site and connected to host computer in Charlotte, N.C. Custom software for broadcasters who already have business computer systems.

BCS/Kaman Sciences Corp. (Booth 425-WH)

Will demonstrate their computer **data processing systems** for TV and radio broadcast stations.

Kings Electronics Co., Inc. (Booth 555-SH)

Will have their line of coaxial and triaxial **connectors;** high voltage connectors; plugs and jacks.

Kliegl Brothers (Booth 107-SP and 401D-WH)

Lighting systems and accessories for TV and studio use will be shown.

LPB, Inc. (Booth 520-SH)

Will show for first time the new Model S-21 **Signature II series of 10-channel dual mono audio consoles;** also emphasizing complete studio systems and accessories, audio processing equipment, low-power AM and FM transmitters and accessories.

L-W International (Booth 566-SH)

To show their line of flickerless TV **film chain projectors.**

Laird Telemedia, Inc. (Booth 551-SH)

Low-cost **character generators** will

continued on page 148

MOVE OVER RCA.
MOVE OVER COLLINS.
MOVE OVER HARRIS.

You'll see new vitality at CCA. New thrust. New products. New people. Professional broadcasters who know where it's at — and how to get there.

A full line of AM, FM and TV transmitters. Our new and innovative circularly polarized, high power, broadband FM antenna. Our TV antennas. Our new solid-state, direct FM exciter. Our new Optimod/FM stereo generator processor. A new high-speed AM limiter. And, much more.

CCA continues its full line of broadcast consoles and accessories, featuring the modular CCA console line, plus our QRK consoles, turntables and accessories.

We have some surprises coming along, too. Some that will make you stop, look and listen — not once — but again and again.

It all adds up to The New CCA — on the move.

And we mean business. Visit CCA in Booth 201 at the Sheraton Park during NAB. You'll see we *really* mean business.

The New CCA!

CCA Electronics Corporation • 716 Jersey Avenue • Gloucester City, N.J. 08030

(609) 456-1716 — or call CCA toll free: 800-257-8171 for Sales and Service
Telex: 845 200 • CCA • ELEC GLCY
In Canada: (416) 438-6320 or call toll free: 800-261-4088

Circle 204 on Reader Service Card

be emphasized; also on display will be slide projectors, time/date generators.

Leitch Video (Booth 613B-SH-A)

Will show for the first time four new products: **Color Black Assignment Switcher; Precision Impulse Clock; PAL Synchronizing Pulse Generator;** and a **Remote Synchronizing Code System.** Also displaying their line of video test equipment.

Lenco Electronics (Booth 312A-SP)

Will show their line of color encoders, video processing amplifiers, pulse distribution amplifiers, sync generators, black burst generators, and other video processing and test equipment.

Lightning Elimination Assoc. (Booth 526-SH)

Full data on systems for **lightning protection** of broadcast installations by discharge arrays.

David Lint Assoc. (Booth 571-SH)

Distributors of many lines of professional **audio equipment,** will demonstrate a number of systems in exhibit.

Lipsner-Smith Corp. (Booth 622-SH-A)

Will introduce the Retec **16mm previewer;** and will also show the CF-2 ultrasonic film cleaning machine.

Listec Television Equipment Corp. (Booth 305-SP)

Main items will be a new Vinten **PortaPed counterbalancing foldable tripod** and a new Vinten **fluid head** (50 lbs. capacity, 60 degrees tilt, adjustable torque).

3M Co., Magnetic A/V Products Div. (Booth 411-WH)

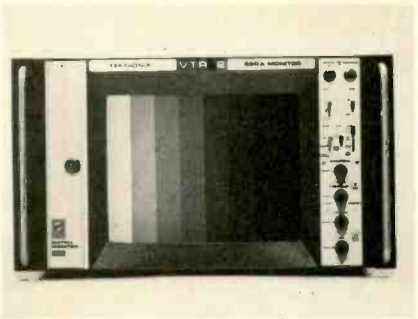
Will show **complete line of broadcast tapes;** 8250 high-audio quad videotape, quad cartridges for 1-in. recorders; and Scotch 250 studio mastering tape.

3M Co., Mincom Div. (Booth 411-WH)

Will introduce the Model 8800 **dual microprocessor character generator,** a microprocessor switcher, a 300-page random access cartridge memory, an in-line image enhancer. Exhibit stresses the application of microprocessor techniques to tilting, visual and imaging systems.

MCI, Inc. (Booth 562A-SH)

Will introduce a **SMPTE tape lock system and synchronizer,** on the JH-110A for automated editing. Also showing the line of tape recorder/players, including the JH-16 multitrack



New Tektronix 650 A Monitor.

machines, the JH-110 series; and recording/remixing consoles and accessories.

Marconi Electronics, Inc. (Booth 106-SP)

Will have on display their line of TV cameras, telecine systems, video switchers, video pulse and distribution amplifers, audio consoles and automatic test equipment.

Marti Electronics, Inc. (Booth 207-SP)

Will show new **automatic repeater** and **mobile repeater for ENG.** Will also have a new SR/1 **ATS Digital Status Unit** and new **Digital Remote Control Equipment.** Also on exhibit will be STL equipment.

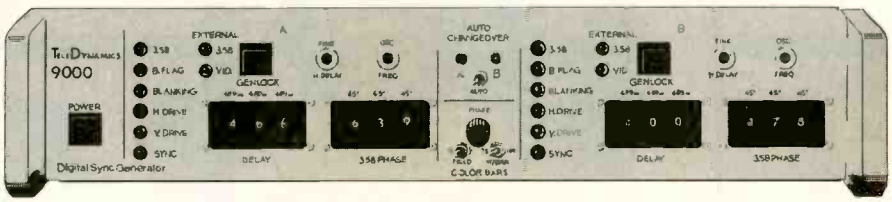
continued on page 150

Sorry Barbara, It's the %!#? sync generator again!

Well Barbara, rest assured you're not suffering alone. And, your engineer isn't trying to make you look bad either. It's just that everyone is using outmoded Sync Generators. Let's face it, most products available are minor up-dates of the ones we used when Uncle Milty was the biggest star around. He's passed into TV history . . . and so has your sync generator.

THE NEW TELEDYNAMICS 9000 A TOTALLY DEPENDABLE DUAL DIGITAL SYNC GENERATOR

The Teledynamics model 9000 is a completely new DIGITAL sync generator with automatic changeover to a self contained duplicate DIGITAL sync generator. It provides absolute stability in all modes of operation. Genlock specs on the 9000 set the standard of excellence for the industry. Sync jitter in normal or genlock mode is less than 1 nsec. Master sync generator and color quality performance and super reliability yet it actually costs you less than the old fashioned units now in use.



standard exceeds EIA performance specs.

Simplified digital design and compact modular construction mean that servicing can be performed by inexperienced personnel. There are NO INTERNAL ADJUSTMENTS. And PLUG-IN CIRCUIT BOARDS provide for instantaneous repair.

THE BEST COSTS LESS

The TD 9000 gives you top

Write today for complete information and specifications on the all new TD 9000 DUAL DIGITAL SYNC GENERATOR. Keep your Barbara happy.

TELEDYNAMICS

11140 Talbert Ave.
Fountain Valley, CA 92708
(714) 540-8424

DISTRIBUTOR INQUIRIES WELCOMED

Circle 207 on Reader Service Card

Rank's New Multi-Role Lens Extends Optics Flexibility*

A major breakthrough in lens system design has taken place with the introduction of the Rank Optics-Taylor Hobson Multi-Role Lens. The lens is available in two versions: a "portable" MRL, suitable for mounted portable cameras and a fully packaged unit for standard TV cameras.

Called the Varotal MRL, this multi-role lens with a 10:1 zoom allows the user to select lens modules to make up a system which will suit his individual requirements and budget.

It was purposely planned to maximize cost-effectiveness and to extend lens usage under a variety of broadcasting coverage conditions. The result is an extremely compact objective with a wide specification.

The lens differs from previous zoom objectives in that it is modular. It accepts a number of different components which may be selected and interchanged by the user. Because of a novel precision location arrangement and release, which gives instantaneous lens interchange without the need for re-registration or camera adjustment, the MRL has a facility not available with any other lens design today.

MRL Specification on 1 Inch Plumbicon Format

	Wide Angle	Narrow Angle	Standard
Focal Length	13-130MM	26-260MM	16-160MM
Horizontal Field of View	52 Degrees to 5.6 Degrees	28 Degrees to 2.8 Degrees	44 Degrees to 4.6 Degrees
Relative Aperture	F2	F2	F2
Narrow Angle and Aperture With X2.8 R.E.	2 Degrees F5.6	1 Degree F5.6	1.6 Degree F5.6

*Material presented was written by K. Sadhvani & M.J. Salter, Rank Precision Industries, Inc., Des Plaines, IL.

Design Goals

The design goals were to produce a competitively-priced lens having good image quality and to make it as light weight as possible. Furthermore, it should perform to state-of-the-art levels mechanically—servo and control characteristics were aimed to be of the high standard set on earlier Varotal models.

Also important in the list of design targets were operational reliability and good light transmission with minimal lens flare.

The optical specification was considered in terms of user patterns. For example, the range of angles of view, apertures and focusing distances required to give complete coverage under studio and outside broadcast conditions were carefully evaluated.

Consideration of user requirements suggested several approaches. These were evaluated relative to interdisciplinary constraints, technical and manufacturing difficulties, product size and cost.

In the case of optical design, component characteristics were studied first, and lens structures necessary to obtain basic performance were obtained empirically. Compact lens component types were used in a computer model to predict difficulties in correcting aberra-

tions. The resulting optical and mechanical layouts indicated the production and assembly characteristics of the alternatives.

It became apparent that the most significant advantages in terms of specification, size, weight and the user's need for flexibility would come from the use of modular components, despite the design problems in this approach.

Lens Description

Three interchangeable front member types create three basic versions of the lens. These are referred to as the wide angle, narrow angle and standard MRL. Any version of the lens may be converted to either of the other versions simply by interchanging the front member which only takes a few seconds. No adjustment of camera registration or of tube position is required. The maximum relative aperture of each version is the same. Three "INSTANT" range extenders are available: X1.4, X2, X2.8. The narrow angle of 1 degree is achievable at F5.6 on 1 inch plumbicon format, which is better than most other lens systems at this angle.

High efficiency coatings, together with glass types having improved transmission, insure high standards for light efficiency and freedom from glare.

The "Portable" MRL was designed essentially for use with tripod-mounted portable cameras. It can be used with hand held cameras but, practically speaking, only for short times. The focus is manually controlled. Lightweight, high performance zoom and iris servos has been developed. Range extenders are inserted manually while the lens is on the camera. The system is self-centering and light, and the range extenders may be purchased individually or as a set at any time.

The packaged MRL accepts interchangeable manual or servo zoom and focus modules. Servo iris is standard. The MRL package is the first to incorporate the newest film wiring which is both reliable and lightweight.

A set of three turret range extenders is optional at the time of purchase. These are push-button controlled from the pan bar. Automatic iris compensation operates when range extenders are changed.

Available for most standard and portable cameras, the MRL offers the end user the benefit of specifying precisely the optics required for his individual applications, within the constraints of his budget.

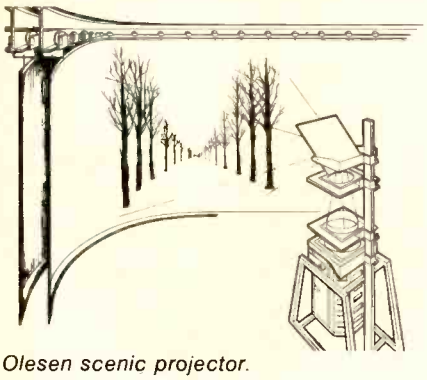
The interchangeable lens fronts give a total range of angles of view from 52°-1°. The Wide front has 52°-2° angle of view and is ideal for the small studio set and smaller outside broadcasts—minimum object distance is 0.6 meter. The Narrow front has 28°-1° angle of view and is for infinity close-ups which are essential for outside broadcasts—minimum object distance is 2 meters. The Standard front has 44°-1.6° angle of view and is a compromise intended for the smaller studio where a number of fronts may not be justified—minimum object distance is 1.2 meters. It is particularly suited to studio work and captioning.

The cost of the new lens system may be spread by purchasing fronts or extenders over a period of time or between a number of lenses. Convenience is insured by the option of changing from a close focusing or lightweight studio lens to a non-ramping narrow angle lens, with good relative aperture, within seconds.

The low weight and small size of the MRL make life easier for crews. And the lens' compactness means that it is not likely to extend beyond the pedestal base. This shortens the cameraman-to-subject distance, and makes it easier to cope with confined sets. In addition, back focus is easily adjustable.

Rank MRL lenses.

NAB '77



Olesen scenic projector.

McCurdy Radio Corp. (Booth 315-SP)

Will show for the first time the **reel-tape switcher, counters, digital clocks, and the SS8400 modular dual channel production console.** Also showing the complete on-air and production studio systems.

McMartin Industries, Inc. (Booth 200A-SP)

Will unveil the new **BF-55K FM transmitters,** 55 kW. Emphasis will also be on remote pickup systems for radio ENG. In addition will show line of AM and FM transmitters, consoles, monitoring equipment.

Memorex Corp. (Booth 401A-WH)

Will show for first time at NAB the **MRX 716 Quantum video tape,** the **MRX 714 video tape for the IVC 9000 recorder.** Also showing the complete line of audio and video tape products.

Merlin Engineerings Works (Booth 534-SH)

A **quad duplication system** will be demonstrated. Quad VTR accessories and conversion kits will be shown.

MicMix Audio Products, Inc. (Booth 547-SH)

Will introduce at NAB **their Master Audio Meter,** peak and VU indicator using LED techniques; their **Time Warp audio delay line** for special effects generation; and the **Super "C" series of reverberation units.**

Micro Consultants, Inc./Quantel (Booth 312-SP)

Will introduce **Time Base Corrector-picture processor and manipulator.** Also featuring digital framestone synchronizer and timebase corrector, and still store.

Microprobe Electronics Inc. (Booth 613A-SH-A)

Microprobe **"LOG 4" automation system,** featuring the Model 100-A programmer will be displayed. Also showing: tape recorders/players; and automation equipment.

Microtime, Inc. (Booth 314-SP)

Will introduce to NAB the Model 2020 Plus, a "total signal corrector" that includes time base correction but also corrects signal errors not treated by time base correction. Also showing line of time base correctors.

Micro-Trak Corp. (Booth 219-SP)

The new products will be the **System D Newsdesk, news production system;** the Models 6445 and 6455 **five-channel consoles;** and the Model 2580 **automatic antenna heater control system.** Also emphasized will be the System D audio production system, the line of consoles and disc reproduction equipment.

Microwave Associates Inc. (Booth 200-SP)

Will introduce two new products: PA-215M **15 watt maximum solidstate 2 GHz RF booster;** and an MA-2cp all channel 2 GHz **high power portable ENG link.** Also featuring ENG Microwave System 2,7 or 13 GHz-versatile "window" mini-cam links, mobile van high power transmitters and down 19nks.

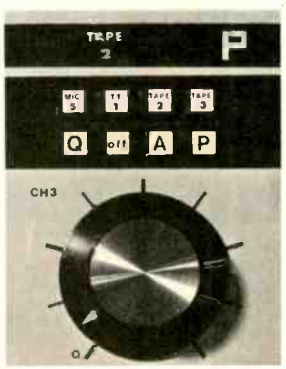
continued on page 155

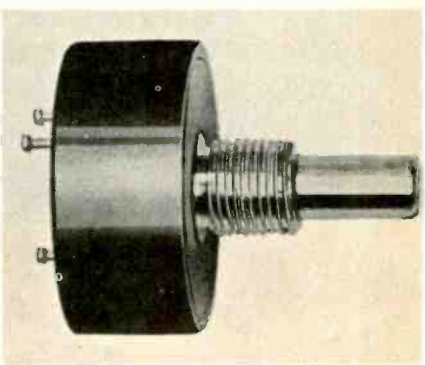
The most advanced trouble-free broadcast console in history!

20 MILLION OPERATIONS guaranteed for switches and pots. New input status indicators. Up to 12 mixers, dual channel. 4 inputs per mixer. Slide or rotary attenuators.

PLUS THESE EXCLUSIVE FEATURES: Silent computer-grade switches; Solid state 'VU' meters; Zero tracking error on stereo models; DC control of all audio functions; Plug-in I.C.'s throughout; Patch panel cue and monitor mute; RF Suppression through individual tuned circuits; plug-in amp modules; Patch panel input gain select; Equalizer and special effects interconnects; Equipment remote control.

AN UNCONDITIONAL 4 YEAR WARRANTY on all Series 38 Consoles.

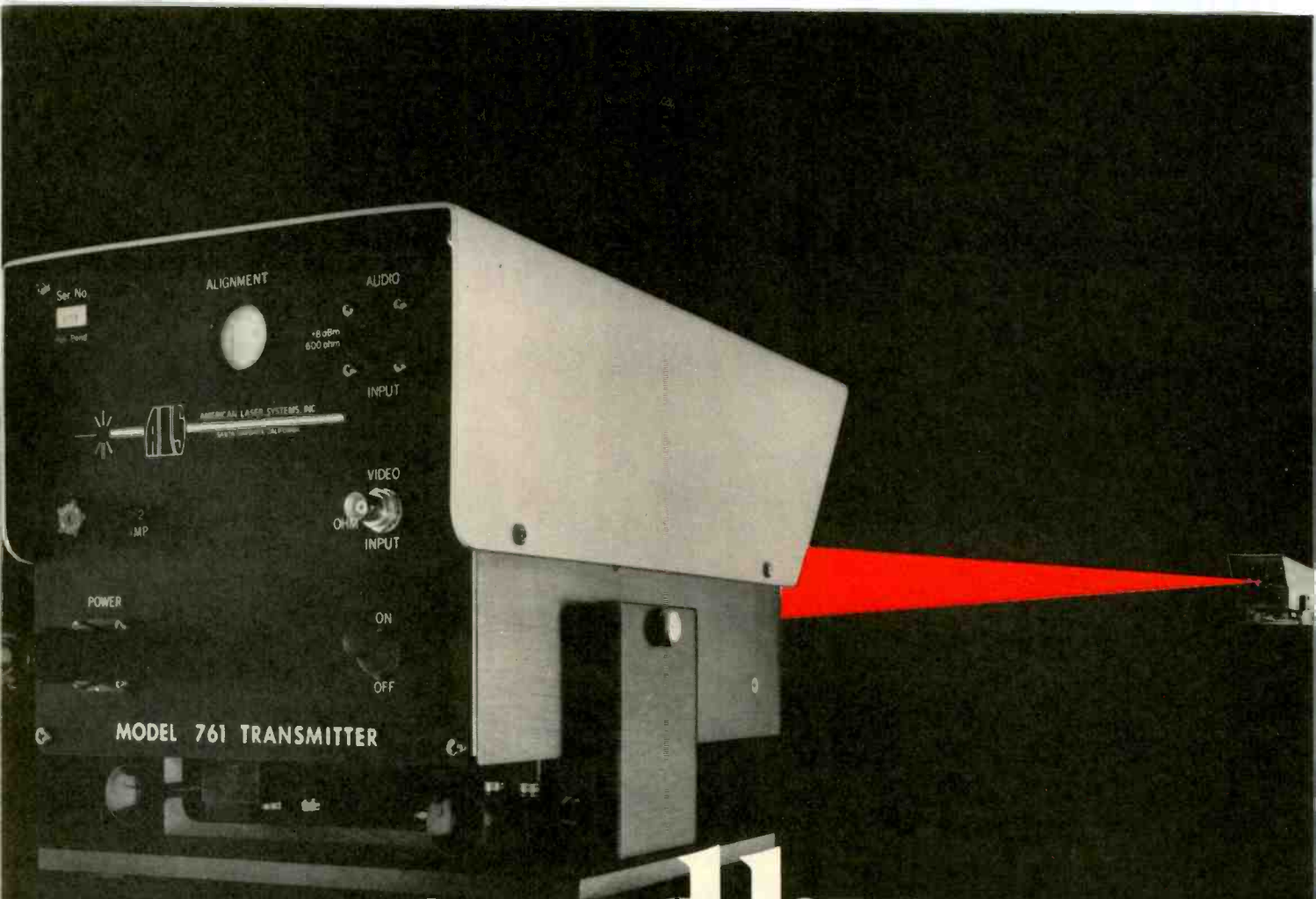




Circle 214 on Reader Service Card

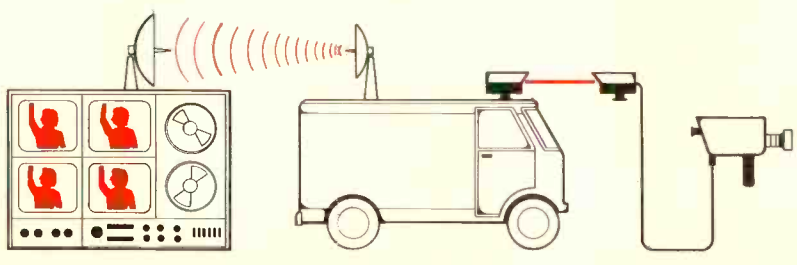
RAMKO RESEARCH

11355-A Folsom Blvd. / Rancho Cordova, California / 95670
(916) 635-3600



send by optical carrier

The missing link in TV transmission is no longer missing! American Laser Systems, Inc. has developed a line-of-sight infrared optical carrier to send audio and TV composite video signals up to a half mile. The '761' capitalizes fully on the potential of Minicams. Save time and manpower needed to lay cable. Extremely fast set-up on a tripod, window ledge, or other stable platform. Utilize your Minicams with greater effectiveness and flexibility. The system can be used as a repeater to transmit greater distances and in duplex mode. Permits supervisory video and audio to be transmitted to the cameraman at the remote site. Transmission is affected only by extreme fog. Signals are of studio quality and NTSC color compatible. Keep in mind that the '761' is not limited to Minicams. Any 1-volt (p-p) composite video signal will do, whether from TV cameras, VTR's or demodulated microwave basebands. This infrared carrier meets all N.T.S.C. specifications. AND REQUIRES NO FCC LICENSE! Inquire today. Contact your local dealer or American Laser Systems, Inc.



CORPORATE HEADQUARTERS:
106 JAMES FOWLER ROAD
SANTA BARBARA AIRPORT
GOLETA, CALIFORNIA 93017
TEL: (805) 967-0423/TWX: 910 334-3462

AMERICAN LASER SYSTEMS, INC
(NATIONAL SALES OFFICE)
999 NO. SEPULVEDA BLVD
EL SEGUNDO, CALIFORNIA 90245
TEL: (213) 640-2089

Circle 215 on Reader Service Card

MicMix C series reverb unit.

Mole-Richardson Co. (Booth 102-SP)

Will show **lighting systems** for TV and studio use; microphone booms; mechanical special effects equipment.

Moseley Associates, Inc. (Booth 203-SP)

Will introduce an **automatic transmitter system (ATS);** the Model TFL-20, **a new audio limiter;** the Model TCS-1 **telecontrol system;** remote control; and the Model DCS-2A **digital control system.** Also showing: line of remote control, remote pickup, STL equipment.

Nagra Magnetic Recoders, Inc. (Booth 606-SH-A)

Will show for first time the **Nagra Model "E", an "economy" portable aimed for radio remote pickup service,** non-synchronous with simplified controls. Also showing the complete line of portable machines for recording applications.

NEC America, Inc./Broadcast Equipment Div. (Booth 533-SH)

Will introduce **FS-15 Frame S Synchronizer; TT-3000 1-in. broadcast VTR; TTR-7, TTR-5 portable VTR's; NTC-5000 broadcast TBC.** Also showing standard line of: time base correctors; frame synchronizers; and VTRs (helical/segmented).

Nortronics Co., Inc. (Booth 522-SH)

Introducing to NAB their Handylap **head lapping** kit, and their Duracore **replacement tape heads.**

Nurad Inc. (Booth 230-SP)

Will introduce the **Superquad™, a quad polarized microwave antenna.** Also showing their standard line of microwave equipment, satellite earth stations, transmission line and connectors.

O'Connor Engineering Labs. (Booth 573-SH)

Will show line of **camera tripods and heads.**

Olesen Co. (Booth 423B-WH)

A new exhibitor at NAB, will show the **Olesen Scenic Projector,** for front or rear projection of almost any scenic effect. Also a complete line of curtains and tracks for broadcasting studios; and the new Dura/60/70 acetate and polyester color filters.

Optek, Inc. (Booth 603-SH-A)

Will have on display their bulk erasers, head degaussers, demodulators.

Orban Assoc. (Orban/Parasound). (Booth 539-SH)

Showing the Orban/Parasound **compressor/limiter Model 418A,** for recording, production, etc.

Orrox Corp. (Booth 226-SP)

See CMX Systems and Videomax listings.

Otari Corp. (Booth 617-SH-A)

Showing for first time at NAB their **Mark II ¼-inch two channel** and **½-inch two channel tape recorder/players for table top or console mounting.** Also showing tape reproducer for automation systems; full line of one to eight-track machines.

Pacific Recorders and Engineering Corp. (Booth 549-SH)

Showing audio limiter/compressor;

continued on page 156

Scully 284B—8-track with Varisync.

digital timing systems; custom audio consoles; preamps, line and distribution amplifiers.

Panasonic Video Systems (Military Room-WH)

Will show the AK900, studio video camera; also will emphasize the MV-9200—MV9500—MVA9500 combination as an economical editing system for ¾" video tape.

Paperwork Systems Inc. (Booth 542-SH)

Will show for the first time Datapoint 4520, 4220, and 1154 **Computer Systems** and a Centronics 104, 200-line-per-minute **printer.** Also exhibiting; computerized business automation systems for radio, TV, and cable television.

Phelps Dodge Communications Co. (Booth 439-WH)

Will show their line of FM **antennas, transmission lines,** RF filters, coaxial cable.

Philips Broadcast Equipment Corp. (Booth 100-SP)

Theme will be the "Innovision" company. New innovations demonstrated will be the **Video 80 Color Camera** and **Production System,** the **LDK Telecine Camera Chain** and broadcast **transmitters.**

Philips Test & Measuring Equipment (Booth 605-SH-A)

Will show for first time **VITS automatic analyzer, and synchronous demodulator.** Also displaying a complete range of measuring equipment for TV transmission, ranging from two pattern to demodulation and signal analysis.

Potomac Instruments Inc. (Booth 524-SH)

Will introduce the AT-51 **Audio Test System.** Also featuring broadcast instrumentation, including: test equipment; automation equipment; and AM monitoring equipment.

Power-Optics Inc. (Booth 304-SP)

Attraction will be **remote control camera systems including Scene-Synch,** device which allows the camera to pan and tilt using chroma-key techniques. Will also show Glasikon which is a low optical color comparative.

QEI Corp. (Booth 548-SH)

Showing AM and FM **monitoring equipment, stereo exciters,** audio processing equipment.

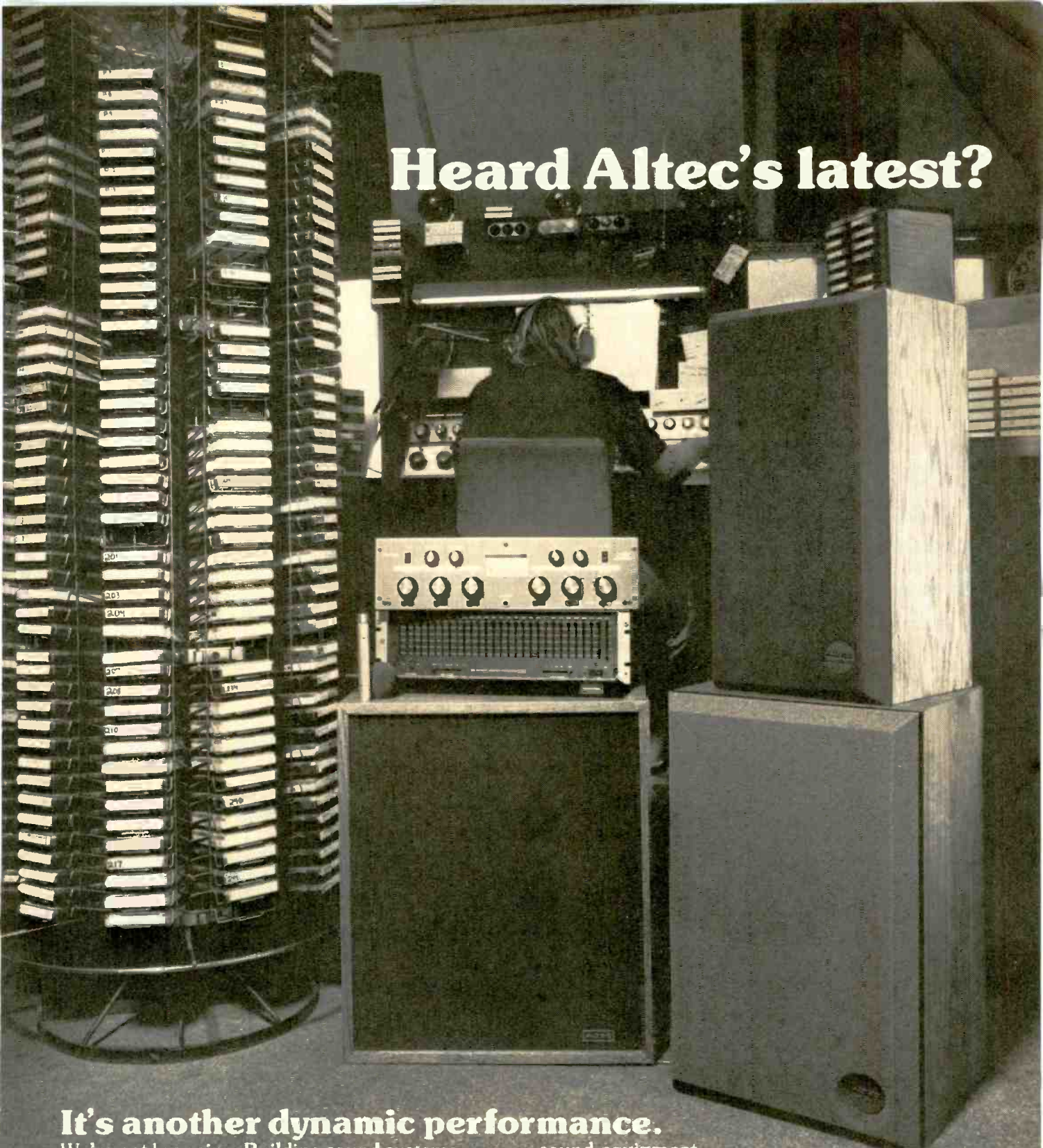
Q-TV Telesync (Booth 419-WH)

Will display their line of **TV prompter systems,** the Model VPS-100 Console transport and the VPS-300 conveyor transport.

Quick Set, Inc, (Booth 421A-WH)

Will have their camera **tripods and dollies,** camera stand and mounts,

continued on page 158



Heard Altec's latest?

It's another dynamic performance.

We're not bragging. Building sound systems with superb dynamic performance has been our profession for over 40 years – we wouldn't settle for anything less. Straight fact.

If your profession is centered around spending long hours in a broadcast studio, you can't afford to be distracted or fatigued by poor quality audio. You've got to have the best, distortion-free equipment available. Clean. Clear. Dynamic.

At Altec, we make a wide range of top quality sound equipment – microphones, remote mixers, equalizers, monitors – that will help make a pleasure out of your demanding profession.

For further information on how Altec can add dynamic performance to your studio's sound system, write to: Altec Sound Products Division, Commercial Sales Dept.

Location photography courtesy of KEZY Radio, Anaheim, Ca

ALTEC

the sound of experience.

1515 S. Manchester Ave., Anaheim, Calif. 92803 • 714/774-2900
ALTEC CORPORATION

Circle 218 on Reader Service Card

braces for ENG cameras.

RCA Broadcast Systems (Booth 400-WH)

Among the highlights of this broad line manufacturer will be **a new broadcast color camera suitable for studio or field use.** Dubbed the TK-760, the new camera is built around the head of TK-76 ENG Camera. **New RCA-specified type Saticon tubes** are used. Other big new product will be a completely **solid-state 5 kW radio transmitter.** New equipment for implementing automatic transmitting systems will also be shown. In the videotape area the highlight will be the TR-600/AE-600 editor/recorder combination. The company will show complete ENG systems, a full line of cameras, UHF and VHF transmitters, CP antennas, AM and FM transmitters, two way radios and telecine equipment.

RCA Electro Optics and Devices (Booth 401B-WH)

Will be announcing new RCA Specified ⅔-in. **Saticon tubes (BC4908) for ENG** and field cameras. New line of Vidicon and lead oxide tubes carrying BC prefix for broadcast quality will also be announced. Power tubes will also be shown.

Ramko Research, Inc. (Booth 564-SH)

Will introduce **eight new audio consoles,** emphasizing solid-state meters, DC remote control, alpha-numeric displays; also audio crosspoint switchers, line equalizers, audio distribution systems.

Rank Precision Industries (Booth 409-WH)

Key item will be a new **Varotal Multi-Role (MRL) Lens.** Lens can be easily changed through use of modular components. (See separate story on lens earlier.) Repeat attraction will be the MK III Flying Spot Telecine system.

Rapid-Q/Edco Products (Booth 306-SP)

Will introduce a new line of broadcast cassette recorder/players; and also a new video routing switcher. Will also show the Rapid-Q line of cartridge recorder/players; and the stereo phase enhancer.

Recortec, Inc., (Booth 423-WH)

On display will be **video tape recorders, tape evaluators,** tape conditioners; videotape editors; quad upgrade kits, with emphasis on the new "Auto Cue," automated tape locator, incorporated in up-grade kits; also their audio cassette loading and duplicating systems.

Revox Corp. (Booth 221-SP)

On display will be the A77 and A700 **tape recorders;** FM tuners, power amplifiers; Lamb mixers and consoles.

Richmond Hill Labs., Ltd. (Booth 208-SP)

New product will be the VPM 3112 **video production switcher.** Also shown: line of other production switchers and special effects generators.

Robins Broadcast and Sound Equipment Corp. (Booth 545-SH)

Will show for first time a **new series of broadcast console modules;** also a TV production console.

Rohde & Schwarz Co. (USA) Inc. (Booth 321-SP)

Will introduce three new products: **TV demodulator VSD 3 (Barco); new color bridge monitor; and Audiodat System** (Monitoring FM and TV sound equipment). Also showing standard line of color monitors; TV demodulators; and automated measuring equipment for video and sound.

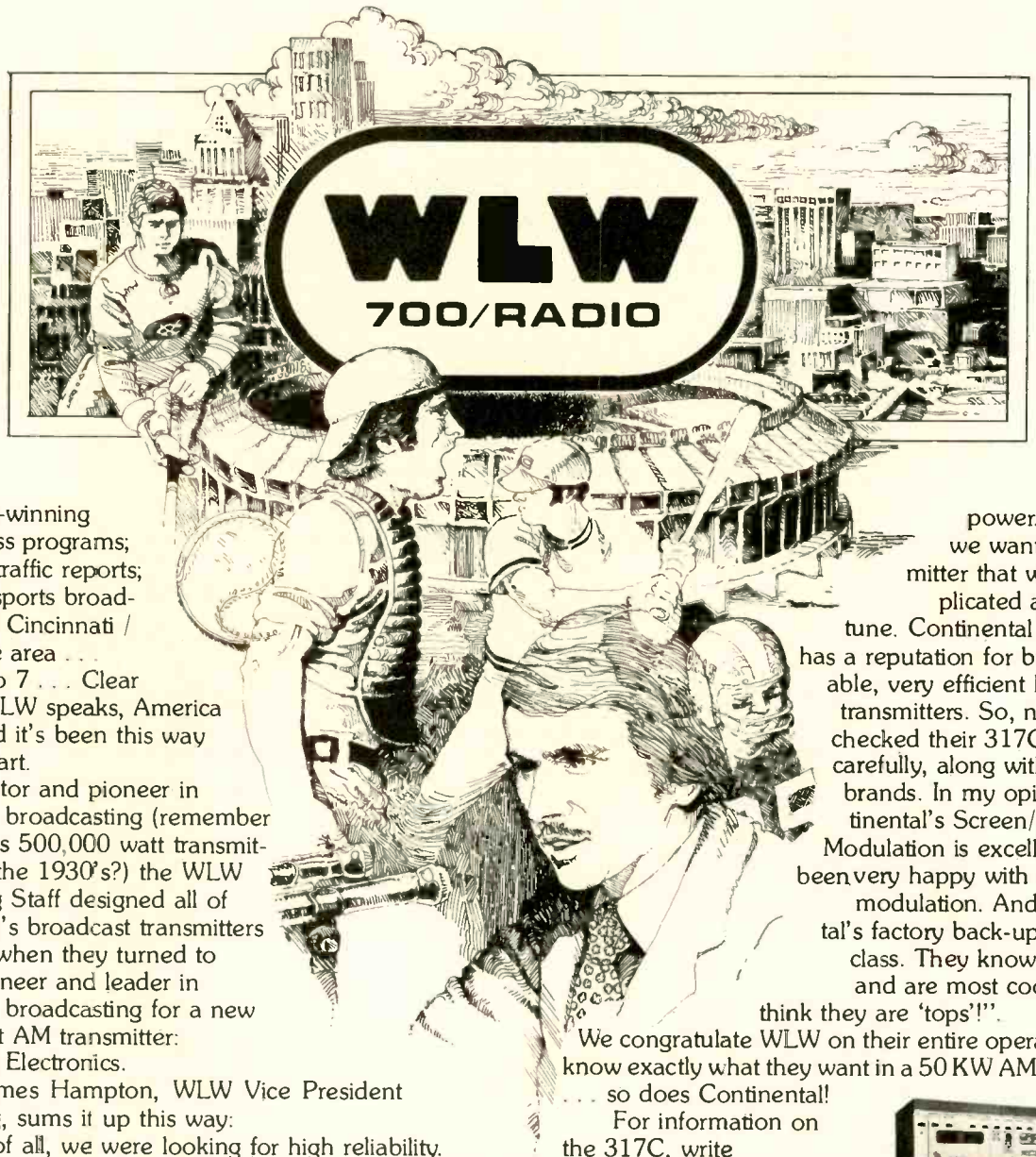
Rosco Labs. Inc. (Booth 556-SH)

Will introduce a **heat stable color media;** also showing TV and motion

continued on page 160

WLW KNOWS EXACTLY WHAT THEY WANT IN A 50 KW AM TRANSMITTER.

SO DOES CONTINENTAL ELECTRONICS!



Award-winning agri-business programs; commuter traffic reports; news; live sports broadcasts to the Cincinnati / Three-State area . . . when Radio 7 . . . Clear Channel WLW speaks, America listens! And it's been this way from the start.

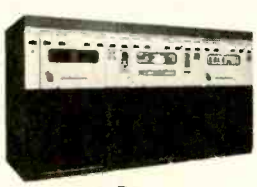
Innovator and pioneer in high-power broadcasting (remember their famous 500,000 watt transmitter built in the 1930's?) the WLW Engineering Staff designed all of their station's broadcast transmitters until 1976 when they turned to another pioneer and leader in high-power broadcasting for a new 50,000 watt AM transmitter: Continental Electronics.

Mr. James Hampton, WLW Vice President Engineering, sums it up this way:

"First of all, we were looking for high reliability. Dead air is disastrous: when you're off the air, the audience loses confidence in you. Next, we wanted efficiency. Especially in the face of the increasing costs of power. And then, we wanted a transmitter that was uncomplicated and easy to tune. Continental Electronics has a reputation for building reliable, very efficient high-power transmitters. So, naturally we checked their 317C over very carefully, along with the other brands. In my opinion, Continental's Screen/Impedance Modulation is excellent. We've been very happy with the 317C's modulation. And Continental's factory back-up is just first class. They know their work and are most cooperative. I think they are 'tops'!".

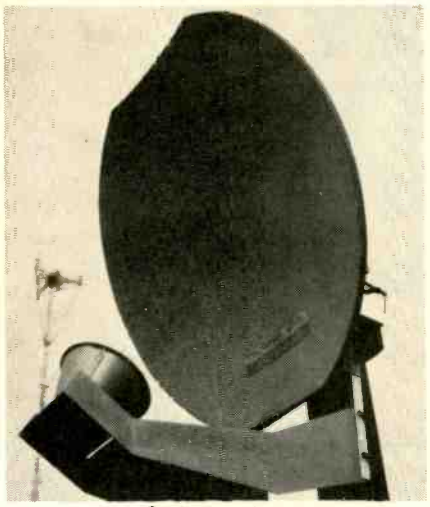
We congratulate WLW on their entire operation. They know exactly what they want in a 50 KW AM transmitter . . . so does Continental!

For information on the 317C, write Continental Electronics Mfg. Co., Box 270879, Dallas, Texas 75227.



Continental Electronics

Circle 221 on Reader Service Card



Nurad's new Superquad antenna.

TeleMation's dual Compositor I.

picture materials; front and rear projection materials; and HMI lighting equipment.

Rupert Neve. Inc. (Booth 541-SH)

Will show for first time **new comprehensive radio consoles, and consoles for TV audio production.**

Sansui Electric Co. Ltd. (Booth 602-SH-A)

Showing **systems for FM discrete quad and AM stereo broadcasting;** data on the QS matrix quad system for FM stereo broadcasting.

Scientific-Atlanta Inc. (Booth 532-SH)

Will show for the first time **414 Video Receiver, an automatic antenna position control unit.** Also showing satellite ground stations.

Scully Recording/Div. of Dictaphone (Booth 316-SP)

Will introduce **two new series of tape recorder/players.** Will also show the 280B/284B machines with constant-tension servo drive and fixed/variable pitch control; and a new VARISYNC digital speed control accessory.

Sescom Inc. (Booth 620-SH-A)

Will introduce the President News Bridge, a **passive news bridge for television news conferences.** Also showing their usual line of audio amplifiers; and audio equalizers.

Shintron Co., Inc. (Booth 601-SH-A)

Will show for first time the **Model 375 production switcher** for TV; also their line of switchers for studio and EFP.

Shure Brothers, Inc. (Booth 211-SP)

Will introduce to NAB their **audio equalization analyzer and equalizer;** theme of exhibit will be "Upgrade Your Audio." Also showing microphones, preamplifiers, disc pickups, studio equipment.

Sintronic Corp. (Booth 537-SH)

Will introduce the **TAM-1KB solid state 1000 watt AM transmitter.** Will show line of AM and FM transmitters.

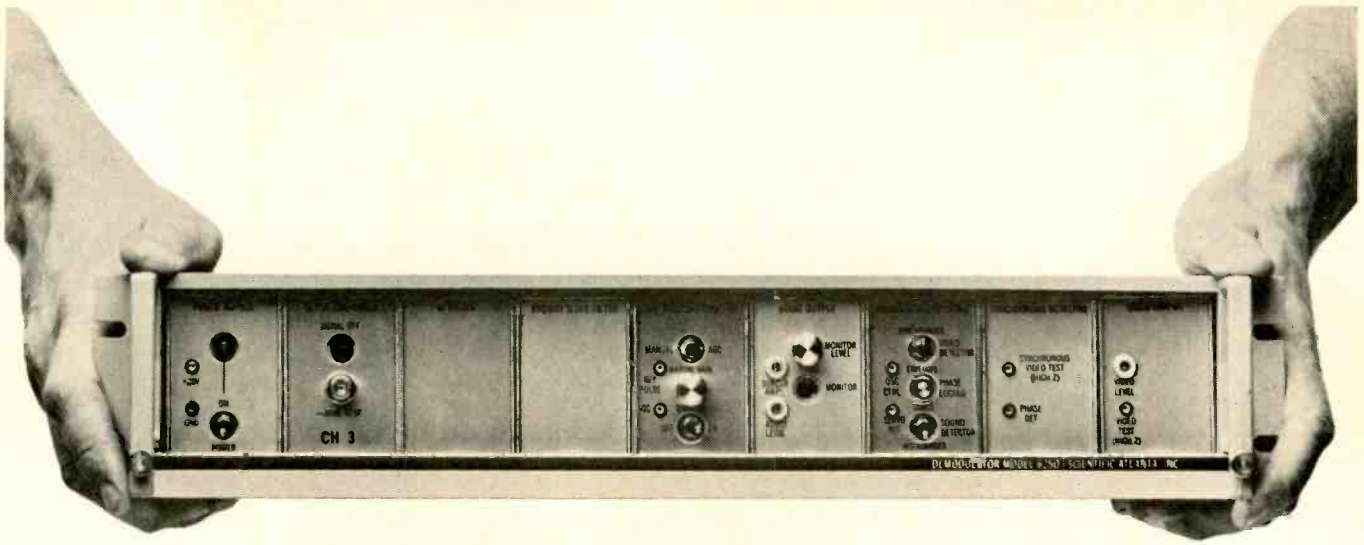
Eric Small and Assoc. (Booth 540-SH)

Will introduce **new ATS equipment** and various radio/studio accessories. Also showing the "Optimod" FM generator-limiter.

Soll, Inc. (Booth 320-SP)

Will display their emergency power systems, mobile van construction and will have a slide presentation showing their radio and TV studio design, complete broadcast facility turnkey installa-

continued on page 162



Our new demod. $1700 and a zero chopper too.

If you've been looking for a good, basic demodulator, Scientific-Atlanta can show you one that's more than just basic for the same money.

With our classy new 6250 you get an envelope detector to closely match the characteristics of the average home television receiver, but with high video fidelity. There's a handy zero chopper built right in so you can accurately measure the depth of modulation of the transmitted signal.

And just take a look at these specs: 100 uv input sensitivity; video response ±0.5 dB to 4.18 MHz; ±2.5% differential gain and ± 1% differential phase. Audio response ±0.5 dB, 30 Hz to 15 KHz. All for no more than $1700.

The new 6250 also brings you an optional synchronous detector to provide superior transient response free of quadrature distortion.

No wonder after comparative bench tests with a unit costing $5000 more, one engineer wrote, "We are amazed at your demod's performance."

Call Harry Banks at (404) 449-2000 or any of our 8 sales and service offices for your free demonstration. We think you'll be more than impressed too.

Scientific Atlanta

United States: 3845 Pleasantdale Road, Atlanta, Ga. 30340, Telephone 404-449-2000, TWX 810-766-4912, Telex 054-2898
Europe: Hindle House, Poyle Road, Colnbrook, Slough, SL30AY, England, Telephone Colnbrook 5424/5, Telex 848561
Canada: 678 Belmont Avenue West, Suite 103, Kitchener, Ontario, Canada N2M-1N6, Telephone 519-745-9445

Circle 224 on Reader Service Card

tions.

Sony Corp. (Booth 506-SH)

Will exhibit video recording, editing and time base correction units for ENG systems.

Sound Technology, Inc. (Booth 561-SH)

Will have their audio and RF generators, harmonic distortion meters, intermodulation meters.

Spindler and Sauppe Inc. (Booth 600-SH-A)

Will introduce **Producer 32 TV Film-chain Slide Projector,** which incorporates microprocessor control. Also showing standard line of slide projection system for film chains.

Stanton Magnetics (Booth 521-SH)

Will emphasize the **stereo wafer headphone** and new cushions for it that aim for more isolated listening and better bass. Also showing the stylus wear gauge; and the line of pickups for disc reproduction.

Storeel Corp. (Booth 441-WH)

On display will be their cabinets and racks for electronic equipment and for storage of tape reels, all sizes.

Strand Century Inc. (Booth 408-WH)

Will introduce the Strand Century **memory lighting control system.** Also featuring Quartzcolor Ianiro lighting equipment for television studios.

Willi Studer America, Inc. (Booth 543-SH)

Will show the Studer tape recorder/players; Beyer microphones; audio consoles.

Systems Concepts (Booth 701-SH)

Will introduce the Q Series character generators, which include models for a wide range of applications, with many choices of performance features.

Systems Marketing Corp. (Booth 215-SP)

Will introduce a new digital dual cassette traffic control system for the DP-2 automation system; also an extended video display of program in memory; and a new titler for printing out monitor information in ATS. Will emphasize ATS-oriented program automation systems.

Taber Mfg. Co. (Booth 525-SH)

Demonstrating the Taberaser, bulk erasers; rebuilt heads for audio and video tape recorders; test tapes.

Technics by Panasonic (Military Room-WH)

Will show for first time at NAB their **open-reel tape decks, RS-1500 series;** their **cassette deck RS-9900;** and their line of **"Linear Phase" loudspeakers.**

Technology Service Corp. (Booth 618-SH-A)

Will demonstrate their complete **turnkey weather radar systems** for television stations, which produce geographical weather information as NTSC electronic signal, in color, with station's geographic area map stored in digital memory for instant map overlay.

Tektronix Inc. (Booth 214-SP)

Will introduce **650A Color Picture Monitor, and 1450 Precision Demodulator.** Also presenting a measurement theater with operational measurements for TV and for AM/FM/Audio.

Tele-Cine Inc. (Booth 423A-WH)

Schneider zoom lenses for studio, field and ENG use will be shown. Among

continued on page 165

TerraCom has closed the loop for Electronic News Gathering

SEE US AT NAB BOOTH 608

The TCM-7 "Miniwave" Transmitter and the TCM-3 Programmable Receiver have joined the TerraCom team. They close the loop for highest performance microwave...from ENG camera, to O.B. van, to repeater, to studio.

Now you can enjoy the satisfaction and cost benefits of using an integrated family of equipment from one source. TerraCom.

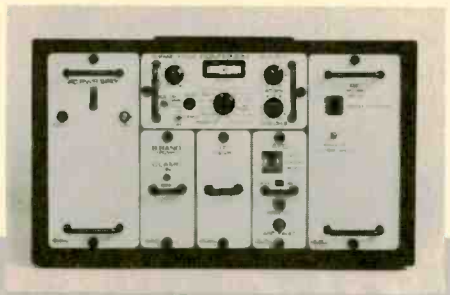
The new TCM-7 and TCM-3 along with the field proven and time tested TCM-6 Series, tunable or fixed tuned transmitters and receivers, will meet all of your microwave requirements at any frequency—2, 7, and 13 GHz.

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

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

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

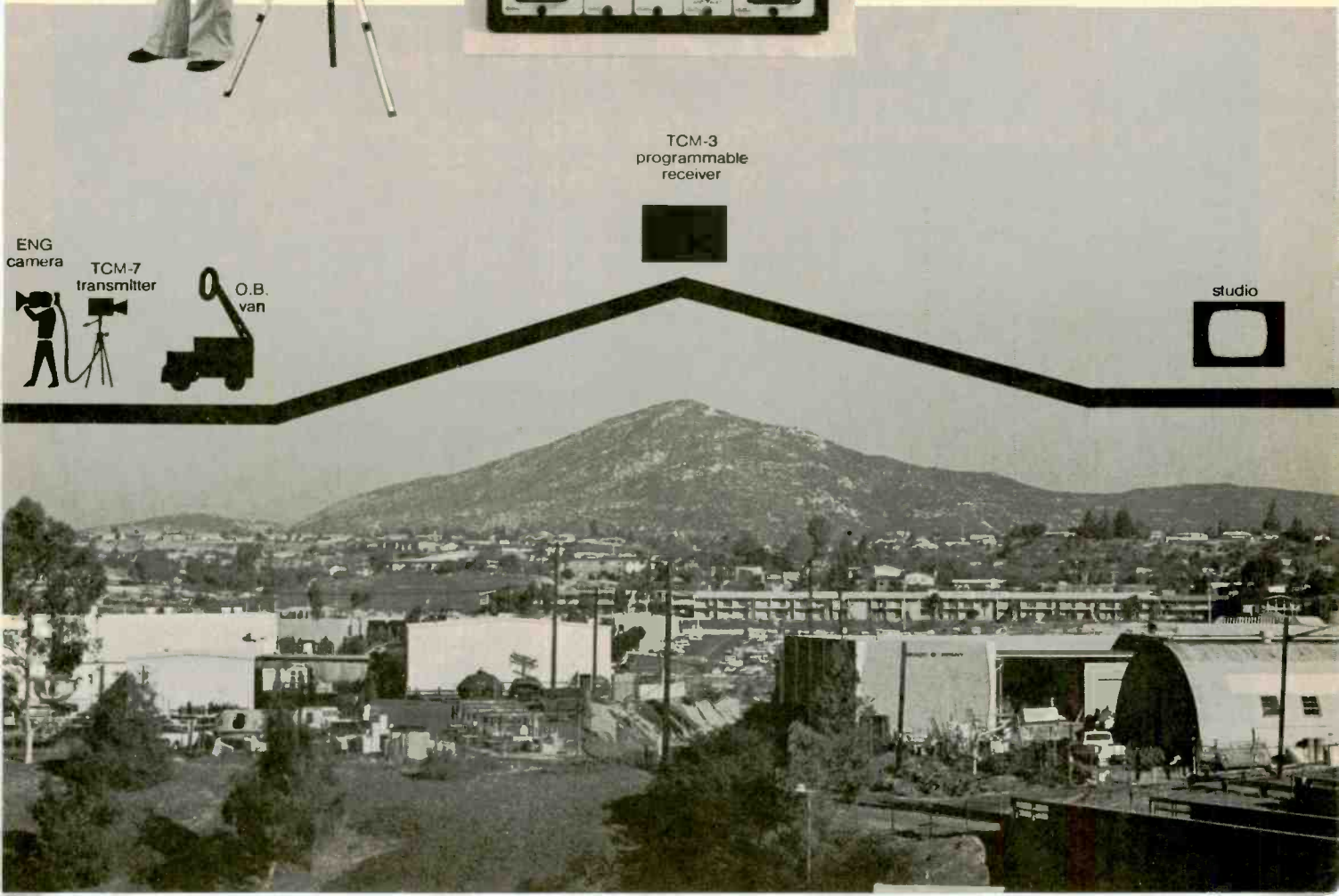
You can close the loop now by calling Bruce Jennings or Bob Boulio at (714) 278-4100. And get the best service in the industry while you're at it.

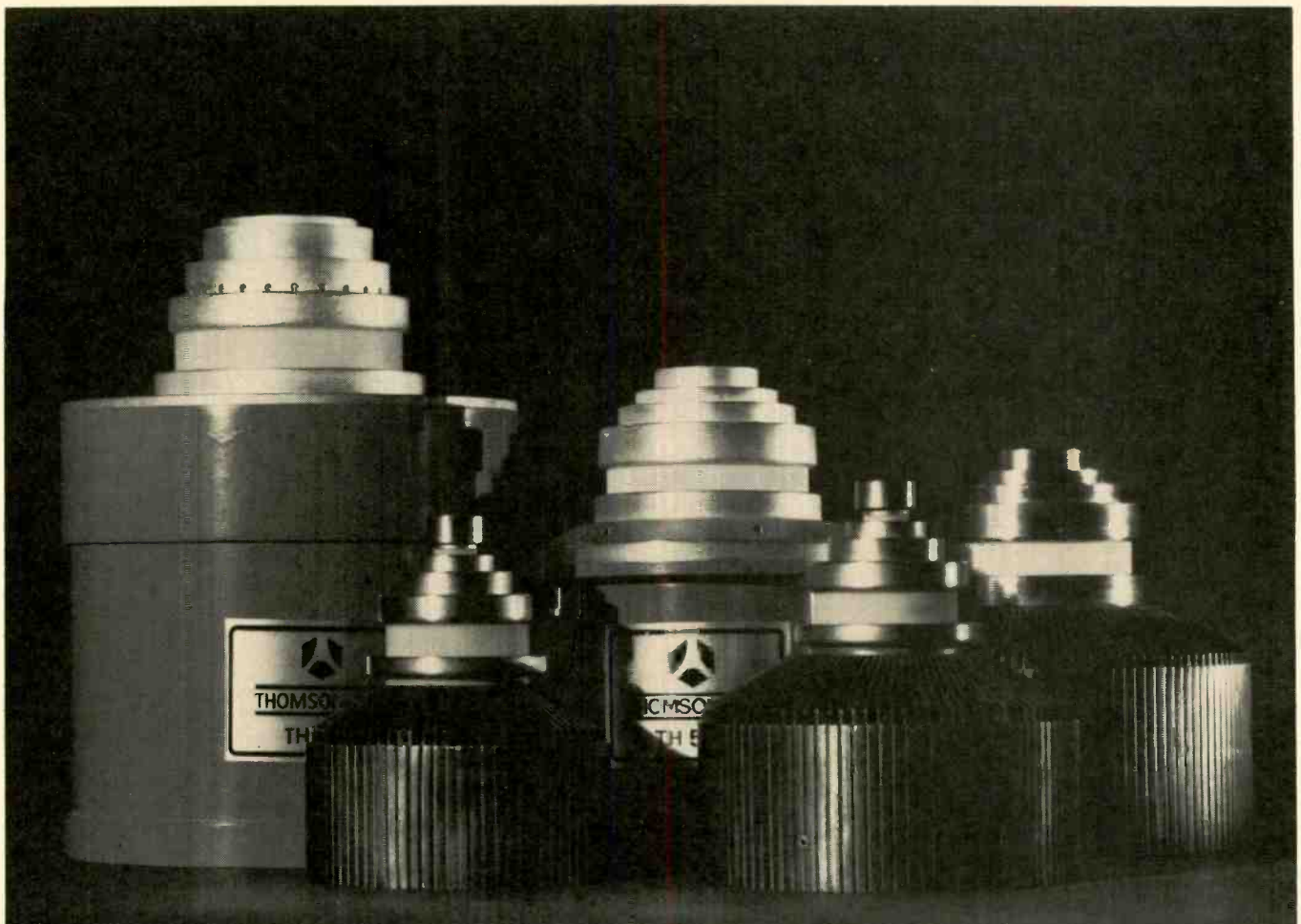


TERRACOM®

DIVISION OF CONIC CORP.
A LORAL SUBSIDIARY
9020 Balboa Avenue, San Diego, CA 92123

Circle 226 on Reader Service Card





What a lineup!

For the best and most complete choice of UHF-TV tetrodes, come to THOMSON-CSF.

- Unsurpassed performance, due to our patented Pyrobloc® grids.
- Extremely low operating costs.
- Compact and light in weight.
- 1.2 to 25 kW of ultralinear output power.
- Air or vapor-phase cooling

THOMSON-CSF

THOMSON-CSF ELECTRON TUBES / 750 BLOOMFIELD AVENUE / CLIFTON NJ 07015 / TEL. : (201) 773-10.04 / TWX : 7109897149
France - THOMSON-CSF Division Tubes Electroniques / 38, rue Vauthier / 92100 BOULOGNE-BILLANCOURT / Tel. : (1) 604.81 75
Germany - THOMSON-CSF Elektronenröhren GmbH / Leerbachstr. 58 / 6000 FRANKFURT am MAIN. 1 / Tel. : (0611) 71 72.8
Italy - THOMSON-CSF Tubi Elettronici SRL / Viale degli Ammiragli 71 / - 00136 ROMA / Tel. : (6) 688.14.58
Japan - THOMSON-CSF Japan K.K. / TBR Building / Kojimachi 5-7 / Chiyoda-Ku / TOKYO / 102 / Tel. : 03) 264.6341
Spain - THOMSON-CSF Tubos Electronicos S.A. / Alcala 87 / 7° Dcha / MADRID 9 / Tel. : (1) 226 78 09
Sweden - THOMSON-CSF Elektronrör AB / Box 27030 / S-10251 STOCKHOLM 27 / Tel. : (08) 265.815
United Kingdom - THOMSON-CSF U.K. LTD / Ringway House / Bell Road / Daneshill / BASINGSTOKE RG24 0QG / Tel. : (0256) 29.155 / Telex : 858865

24H4

Circle 227 on Reader Service Card

the specific new products are **a 30:1 field lens** 33-1000 (for 1¼ tubes), **a 26-800mm zoom** (for one-inch formats) and a **10x ENG lens** 10-100 for ENG use will be promoted.

Telecommunications Industries Ltd. (Booth 510-SH)

Will introduce Porta-Pattern Format **BBC #61 Color Flesh Tone Reference, ENG/EFP two chart systems.** Also displaying: spherical transparency illuminator; gray scale transparencies; and electronic cinematography charts.

Teledyne Camera Systems (Booth 213-SP)

Will feature the **CTR-3 Tri-Optical Color Telefilm Recorder,** and tape-to-film transfer systems.

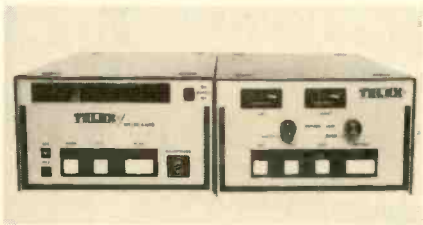
TeleMation Inc. (Booth 421-WH)

Will show for the first time the **Dual Compositor I.** Also on exhibit will be: TVS/TAS-1000 Audio/Video distribution switcher; character generators; and film chains.

Telemet, Div. of Geotel (Booth 415-WH)

Will show for the first time a **new sideband and spectrum analyzer;** will also introduce a new **video production switcher.** Also showing their line of video generators, envelope delay measuring systems, VITS keyers, TV demodulators, chroma keyers, image enhancers, video processing amplifiers, TV test equipment.

TEA's Matthey TV line selector.



New Telex cartridge machines.

Telescript, Inc. (Booth 445-WH)

Will show the Telescript **monitor prompting systems,** including choice of script transports, beam splitter to prompt announcer; and Telegraphics, a graphic titling system.

Television Equipment Associates (Booth 528-SH)

Will introduce **new Matthey TV line selector.** Also featuring exhibit on stabilizing TV transmitter output with Matthey Automatic Video Equalizer.

Television Research Intl. (Booth 307-SP)

Will introduce **Trichroma; and the EA-6 editor.** Will also show its standard line of editing products and time code devices.

Telex Communications, Inc. (Booth 319-SP)

Will introduce the Telex/Magnacord **MC series of broadcast cart machines,** with eight new models.

Tentel (Booth 604-SH-A)

Will introduce **TZ-H15-U tension gauge** for the Sony 2850 and other U-matics. Also exhibiting tension testing gauges for video and audio recorders.

TerraCom (Booth 608-SH-A)

Will introduce two products: **TCM-7 Series "Miniwave" transmitter;** and **TCM-3 Series receiver.** Also featur-

continued on page 166

NAB '77

Noise reducer from Thomson CSF.

ing their line of ENG microwave system.

Thomson-CSF Labs. (Booth 103-SP)

Will introduce **Digital Noise Reducer, Vidifont System with multiframe,** and **single and dual channel 950 MHz wireless microphones.** Also featuring: ENG TV cameras; character generators; TV cameras; film chains; image enhancers; color correction systems; audio processing equipment; microphones and accessories; and FM monitoring equipment.

Time and Frequency Technology, Inc. (Booth 501-SH)

Will show for first time a new **modular digital transmitter remote control, new ATS equipment,** and a **new FM modulation monitor.** Will also emphasize tuneable FM and AM monitors.

Townsend Associates, Inc. (Booth 519-SH)

Will have their new **IF modulated exciter for UHF** klystron TV transmitters; also line of exciters for updating VHF and UHF transmitters.

Trace Inc. (Booth 609-SH-A)

Will introduce Trace VIP, **a complete broadcast management software system,** hardware interface to broadcast automation. Exhibit will feature end to end system for broadcast management.

UMC Electronics/Beaucart Div. (Booth 562-SH)

Will introduce to NAB a new **economy line of tape cartridge machines.** Will also show standard line of cart machines, splice finders, heads, motors.

United Research Lab Corp. (Booth 318-SP)

Will show for first time a "reasonably priced **"tape locator.** Also showing the Auto-Tec line of recorder/players; and exact duplicate parts for other professional recorders.

Utility Tower Co. (Booth 210-SP)

Will display their line of antennas and towers for TV, AM, FM, CATV, and microwave service; and their complete A3 lighting kit for towers.

Video Aids Corp. of Colorado (Booth 511-SH)

Will feature **NTSC multi-test generator** and **VITS inserter; ENG battery-operated SYNC generator; and black burst generator.** Also exhibiting: video tape editors; picture monitors; test equipment; and audio processing equipment.

The Video Tape Co. (Booth 428A-WH)

Will feature VTC 1000 **Quadruplex Video Tape,** and VTC **U-Matic Videocassettes.**

Videomax (Booth 226-SP)

Quad video head refurbishing will be highlighted.

Visual Electronics/Edco. See Rapid Q.

Vital Industries Inc. (Booth 406-WH)

Will introduce **SQUEEZOOM, a switcher that will squeeze, freeze a full frame and zoom a picture.** Also exhibiting: video tape editors; time base correctors; still store; frame synchronizers; routing switchers; switching automation; production switcher (large and small); master control switchers; and automation equipment for radio.

Ward-Beck Systems, Inc. (Booth 515-SH)

New products will be a **limiter/compressor;** a **noise gate;** a **variable filter.** Also showing television audio mixers and consoles.

Wilkinson Electronics (Booth 500-SH)

The new product shown will be the **FM-1500E, 1.5 kW FM transmitter.** Also shown: line of FM and AM transmitters, silicon rectifier stacks, AC line surge protector, monitoring equipment.

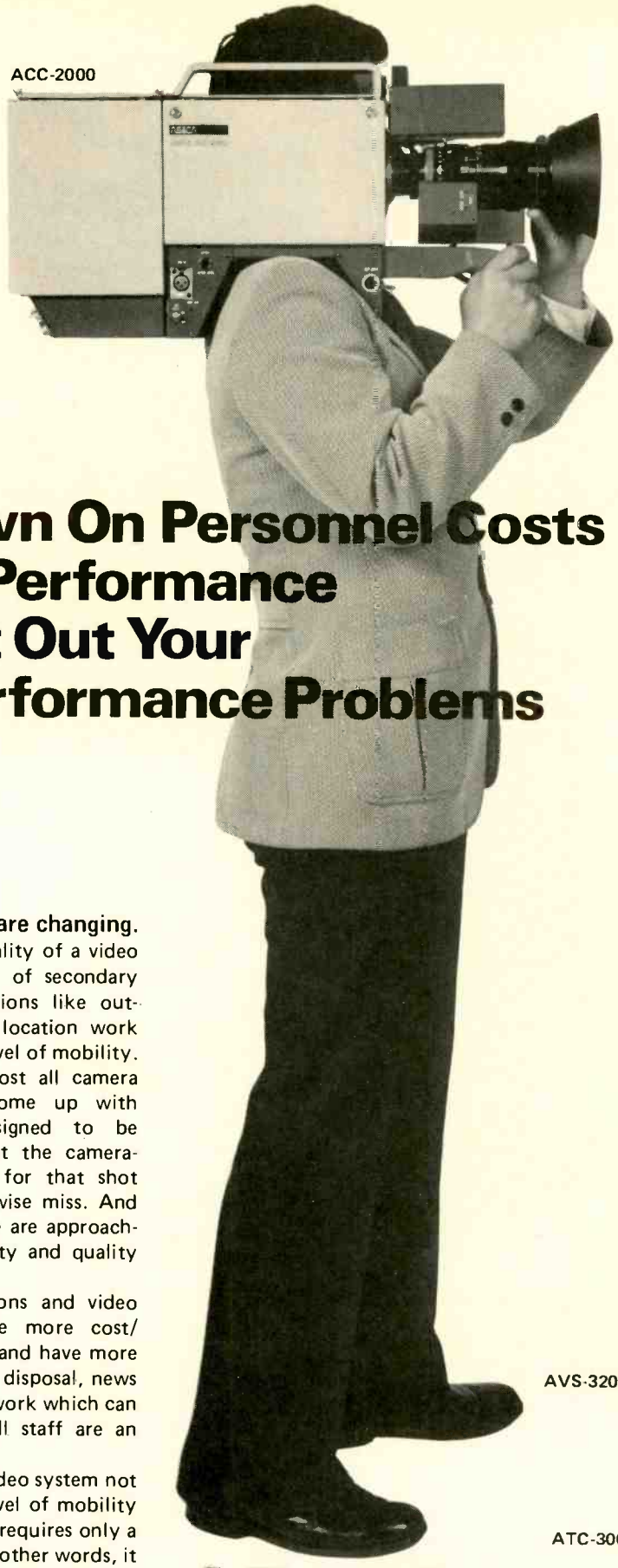
The Winsted Corp. (Booth 612-SH-A)

Showing for the first time **modular consoles** (cabinets) for holding all units in video editing systems. Also showing video tape and film storage cabinets, tape trucks.

World Video, Inc. (Booth 427-WH)

Will introduce the CR6220 **12-in. color video monitor** for professional application, and the CR6220 **RGB high resolution color video monitor.** Also exhibiting: broadcast and CCTV one-gun (Trinitron) color monitors; and demodulators, AC/DC color portable monitor.

NAB Late Entries. Bayly Engr., 613-SH; Alan Gordon, 615-SH; GYYR Products, 567-SH; Intl. Microwave, 704-SH; Kay Industries, 610-SH; Knox Ltd, 703-SH; Minneapolis Magnetics, 516-SH; Motorola, 611-SH; NTI, 550A-SH; Uni-Set, 700-SH; Westar, 431-WH; Wolf Coach, 575-SH.



ACC-2000

Cut Down On Personnel Costs Not On Performance And Cut Out Your Cost/performance Problems

Times and attitudes are changing.

No longer is the quality of a video camera thought to be of secondary importance in applications like outdoor ENG and video location work which require a high level of mobility.

This is because almost all camera manufacturers have come up with compact cameras designed to be carried around so that the cameraman is always ready for that shot which he might otherwise miss. And it's true to say that we are approaching the age when quality and quality alone sells.

Now that TV stations and video production studios are more cost/performance-conscious and have more limited funds are their disposal, news gathering and location work which can be edited with a small staff are an attractive proposition.

ASACA's portable video system not only displays a high level of mobility and quality, but it also requires only a limited editing staff. In other words, it solves the cost and performance problems — not to mention the cost/performance problems.

ASACA ACC-2000

PORTABLE COLOR TV CAMERA

Features

1. In either back pack-less type or in head-shoulder pack type available.
2. The optical system is so designed that the cine lens permits a free range of applications.
3. 2 line contour compensator.
4. A very little power consumption — only ±7.2V (with 12 nickel-cadmium batteries).
5. The accessory remote control unit enables a multiple number of cameras and a VTR to be used at will.
6. The model is designed according to the principles of human engineering and so it is extremely easy to handle together with high level of balance.

ASACA AVS-3200B

1-INCH QUAD PORTABLE VTR

Features

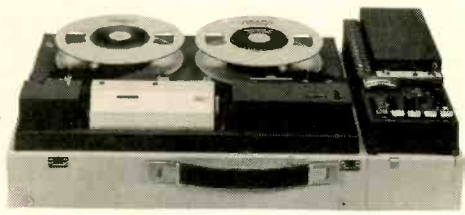
1. A built-in color playback adaptor which allows on-the-spot checks of the recorded pictures incorporated.
2. With an assembly editing function, recording is possible at the selected recording points, without the signals being thrown into disarray.
3. A servo lock, FM modulation factor, tape threading and vacuum unit alarm functions included.
4. The recording current optimizer for easy set-up of the best recording current.
5. Two kinds of DC packs: ABU-300B lead battery type, ABU-301B nickel-cadmium battery type. They supply sufficient power for 45 minutes and 90 minutes of recording time each.

ASACA ATC-300B

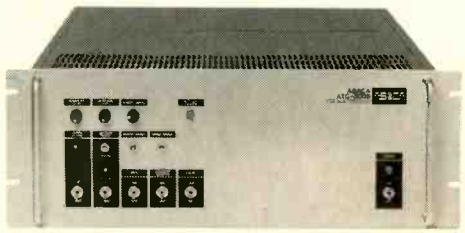
TIME BASE CORRECTOR

Features

1. With a newly developed 8-bit AD converter, the wide range of the time base correction ±30μ sec. performed.
2. Velocity error compensation
   The ATC-300B works on a line-by-line basis, and it faithfully detects the error components with respect to the velocity error of every horizontal line, and compensates for them.
3. Drop out compensation.
4. The model is provided with a picture splitting function which comes in handy for monitoring the time base jitter of playback signals.



AVS-3200B



ATC-300B

ASACA

ASACA CORPORATION

3-2-28 Asahigaoka, Hino, Tokyo, Japan Tel: 0425-83-1211 Telex: A/B 02842338 ASACA JAPAN

ASACA CORPORATION OF AMERICA

1289 Rand Road, Des Plaines, Ill. 60016, U.S.A. Tel: 312-298-4380, Telex: 72-6351 A/B ASACA DSP

SEE YOU AT NAB BOOTH 424

HILTON

Circle 233 on Reader Service Card

Announcing Best Station And Great Idea Contest Winners

Best Station Award Winners

Your votes on those December station layouts that you liked best are in and we're happy to announce the winners of the 1976 Best Station Award Plaques.

Radio Stations WQXI and WBAC—A Tie! WQXI AM/FM's story, "Getting A Show Place That Reinforces The Heavy Promotional Effort Of A Big-City Station," (Atlanta, Ga.), nosed out WBAC-AM, Cleveland, Tenn., "Convenient, Uncluttered AM Plant With Room For Future FM In A Building 60′ × 50′" by a single vote. That's close enough to award both a plaque. Both stations—one big city, one small town—did a fine job of identifying their station with their respective markets.

FM Station WXBM-FM. WXBM-FM, Milton, Fla., won the FM category neatly with the story "Owner-Engineer-Manager Designs Compact, Efficient Plant For Expansion To 100 kW FM."

TV Station KSTW-TV. KSTX-TV's story, "Flexibility And Redundancy Throughout; Master Control Is The Core For KSTW," won handily making this Seattle/Tacoma station the plaque winner in the TV area.

Great Idea Contest Winners

We studied the way the votes came in this last year and decided a run-off was not necessary. Winners are those that collected the most votes. Three top prize winners in the respective categories of AM, FM and TV for 1976 are:

AM Radio. Emeric S. Bennet, CE, WPVL, Painesville, Ohio, for his system of "Easy Communication With Remote Operator," (June, p. 66).

FM Radio. Frank L. Berry, Dir. of Engineering, WVFM, Lakeland, Fla., for his method of "Automatic Hiss Elimination During Cart Cue-Up," (October, p. 70).

TV. Andrew C. Blanchar, Maintenance Engr., KGO-TV, for his "Inexpensive Instant Phase And Continuity Checker For Audio Cables," (September, p. 158).

Each of these gentlemen will receive a H.P. Scientific Calculator.

In addition, nine runners up get pocket calculators for the next highest scoring ideas in the separate subcategories of audio, control and RF for AM and FM stations and control and video for TV stations. (There were no RF entries from TV stations.) Winners are:

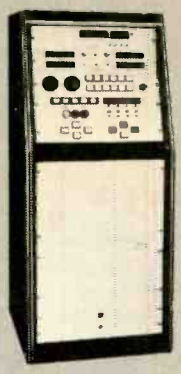
In AM audio—Daniel J. Terta, Jr. Engr., WPTR, Albany, NY, for his entry "Inexpensive Limiter To Prevent Tape Overload In Recording," (April, p. 56); **In AM control**—Jefrrey Baker, Ass't CE, WRKL-AM, Pomona, NY, for his "Fool-Proof Phone-Talk Censor System (April, p. 63); In **AM RF**—Frank Colligan, Consultant, A.D. Ring Associates, for his method of "Reading Antenna Common-Point Data," (May, p. 108).

In FM audio—John F. Moser, Chief Student Engr., WKHS, Kent Co. H.S., Worton, Md., for his "Very Inexpensive Square-Wave Oscillator, 20 Hz-20 kHz, Needs No Switching," (June, p. 70); **FM control**—Gerry VanLoh, CE, KPAT-FM, Sioux Falls, S. Dakota, for his "Tone Systems For Alerting Studio To Tune In Remote Pickup Transmitter," (December, p. 80); **FM RF**—Jacob Z. Schanker, Independent Consultant, Rochester, NY, for his scheme of "Inexpensively Preventing Icing On An Antenna Without Using Heaters," (November, p. 83).

TV audio—Jim Purcell, Technician, WRAU-TV, Peoria, Ill., for his "Automatic Tone/Beeper Oscillator," (November, p. 80); **TV control**—Kurt M. Blackburn, Studio Engr., KUIQ-TV, Eureka, Calif., for his "Cue-Tone Decoder That Actuates Any External Circuit—VTR, Slide Projector, Etc." (November, p. 78); **TV video**—Richard H. Ward, TV Engr., Arizona Medical Center, Tuscon, Az., for his method of "Still-Framing The Sony VP-1000 Video Cassette Player," (April, p. 58).

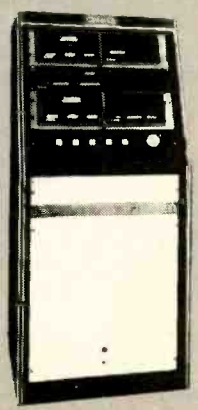
MAGNA-TECH ELECTRONIC

High-Speed Reproducers



EL Console

Prism Projectors



Multi-Lok Console

MTE, The Leader, is the world's finest manufacturer of post-production sound recording and projection equipment for:

- **Motion picture sound studios**
- **Advertising agencies**
- **Educational and instructional film sound facilities**
- **Video sound sweetening**
- **Screening rooms**

MTE, The Leader, was the *first* to introduce:

- **Noiseless pick-up insert recording (rock and roll)**
- **Combination 16, 35, 17.5mm Recorders and Reproducers**
- **Electronic Looping Systems for dialogue replacement**
- **High Speed Re-recording Systems**
- **High Speed Projectors**
- **"Multi-Lok", the Videotape, Film and ATR Interlock System**
- **Crystal controlled electronic drive Recorders and Reproducers**

MTE, The Leader, is winner of two "Academy of Motion Picture Arts and Sciences" awards for Technical Achievement.

MTE, The Leader, provides complete studio engineering services and operating personnel training. Our systems engineers have over 30 years experience in all areas of film production and post-production.

MTE, The Leader, is *ready* to fulfill your needs in sound and projection equipment from a single transfer recorder to a complete re-recording facility.

The next time you have any film or video needs, discuss them with Magna-Tech first. It pays to come to

THE LEADER!

MAGNA-TECH ELECTRONIC CO., INC.

630 Ninth Avenue / New York, N.Y. 10036
Tel. (212) 586-7240 / Telex 126191 / Cables "Magtech"

Quad-Eight Electronics
11929 Vose Street
North Hollywood, California 91605
Tel. (213) 764-1516 / Telex 662446

Magna-Techtronics (Aust.) Pty. Ltd.
P.O. Box 150, Crows Nest, NSW 2064, Australia
Tel. 439-1651/3013
Telex 24655 / Cables "Magna" Sydney

Circle 235 on Reader Service Card

COMMENCING THE 1977 GREAT IDEA CONTEST

The Great Idea Contest, which most of you tell us is a "great idea," continues. We're now into the fourth year but the supply of good ideas seems inexhaustible!

Winners of the 1976 contest, incidentally, are announced on page 169.

BM/E is delighted to continue this feature particularly because it conveys to the industry the ingenuity that individual broadcast engineers possess. We hope you will want to participate this year. Send in your ideas (rules next page). Vote on all the published ideas. It's your contest.

The Votes

Are In!

See Page 169

For The 1976

Great Idea Contest

Winners

1. Audio Phasing Telephone Patch

James W. Nelson, Asst. Chief Engineer, WGST, Atlanta, GA

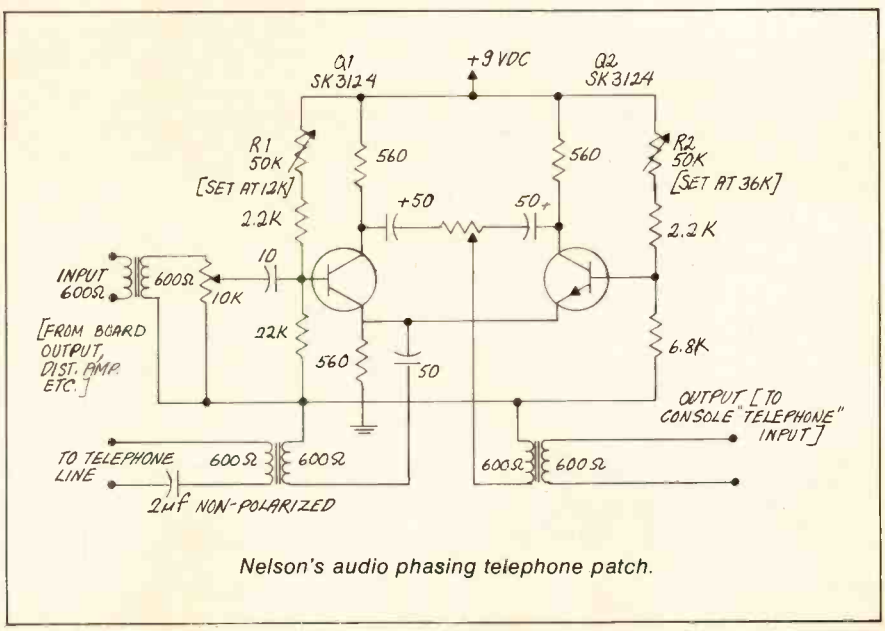
Problem: To eliminate the distortion of the announcer's voice while conversing with a telephone caller.

Solution: This circuit provides a radio station with a telephone patch that eliminates the distortion inherent in the telephone's carbon mic when the announcer is conversing with a caller on the air. The D.J. talks into the studio microphone to talk to the caller on the telephone and is on the air at studio quality at the same time. The D.J. hears the caller and himself in his console headphones. By conversing with the caller using the studio mic and headphones, the D.J. doesn't use the telephone handset at all. The call can be put directly on the air or put on audition channel of the board for tape delay. Either way, the quality of the D.J.'s voice is considerably improved over that of the telephone handset.

The diagram is a phasing null circuit that eliminates feedback of the D.J.'s audio through the board, while allowing the D.J. and the caller to converse on the air. The D.J. audio feeds the base of Q1 and appears 180° out of phase at the output null pot. In-phase D.J. audio appears at Q1 emitter to feed his audio back to the telephone caller and to the Q2 emitter. The D.J. audio appears at the Q2 collector still in-phase, feeding the other side of the output null pot.

The output null pot is adjusted for cancelling of the D.J. audio at the output, thus eliminating the feedback

continued on page 172



Nelson's audio phasing telephone patch.

Great Ideas

patch from the D.J. mic input to board out back to telephone input. The D.J. audio appears on the board only at his mic mixer. The telephone caller's audio feeds both Q1 and Q2 emitters and appears at the output in phase, feeding the board's telephone input. The input and output transformers could be eliminated if they are redundant or if you are using an unbalanced system. R1 and R2 can be trimmed if different transistors are used. Be sure to adjust the output null control to cancel the D.J. audio at the output. Adjust the input level control to keep the D.J. audio below the distortion level of Q1 and Q2.

continued on page 166

Rules for BM/E's Great Idea Contest

1. Eligibility: All station personnel are eligible. Consultants to the industry may enter if the entry indicates the specific station or stations using the idea or concept. Manufacturers of equipment or their representatives are not eligible.

2. How to Enter: Use the Official Entry Form on this page or simply send *BM/E* a description of your work. State the objective or problem and your solution. Include diagrams, drawings, or glossy photos, as appropriate. Artwork must be legible but need not be directly reproducible but not exceeding three in number. Camera reproducible material is preferred. Length can vary, but should not exceed 500 words. *BM/E* reserves the right to edit material. Entry should include: Name, title, station affiliation, and the class of station—TV, FM, AM. Indicate if idea is completely original with you.

3. Material Accepted for Publication: *BM/E* editors will make all decisions regarding acceptability for publication. If duplicative or similar ideas are received, *BM/E* editors will judge which entry or entries to accept. A $10 honorarium will be paid for each item published.

4. Voting: Every reader of *BM/E* is entitled to rank the ideas published. This can be done on the Reader Service Card in the magazine or by letters or cards sent to the *BM/E* office. To vote, readers should select the three ideas they like best and rank them 1, 2, or 3.

5. Winners: Relative ranking of each month's entries will be published periodically. Top-rated entries for various categories will be republished in late 1977 for a second and final round of scoring. Final winners will be picked in February 1978 and notified by mail. Winners will be published in the March 1978 issue of *BM/E*.

6. Prizes and Awards: Three top prizes will be awarded: a slide rule engineering calculator for the entry receiving the most votes in the respective categories of AM, FM and TV. Ten pocket business calculators will be awarded as secondary prizes for the highest voted entries in the following additional categories (except the three top winners): audio (three prizes one each in categories AM, FM, TV; RF (three prizes one each in the categories of AM, FM, TV); Control (three prizes one each in the categories of AM, FM, TV); Video (one prize in TV).

Mail to: Editors, BM/E
295 Madison Avenue
New York, New York 10017

1977 Entry Form

Name_____ **Title**_____

Station Call Letters_____

City_____

State_____ **Zip**_____

Telephone No._____

Licensee_____

Class of Station at which idea is used (check one) TV____ **FM**____ **AM**____

Category: Audio____ **RF**____ **Video**____ **Control**____

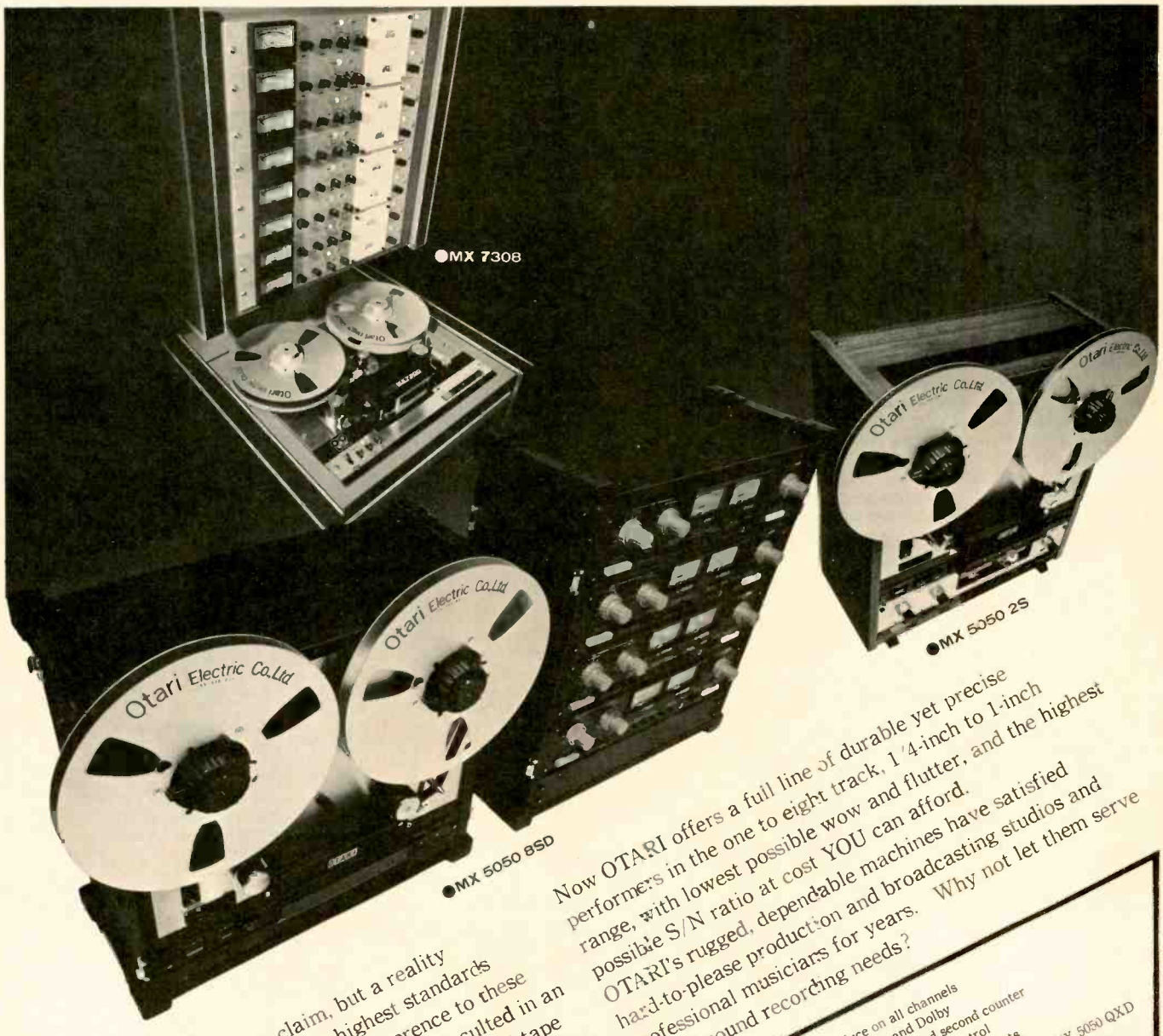
Objective or Problem: *(in few words; use separate sheet for details*_____

Solution: *(Use separate sheet—500 words max)*

I assert that, to the best of my knowledge, the idea submitted is original with this station; and I hereby give BM/E permission to publish the material.

*Signed*_____ *Date*_____

Professional Performance at Popular Prices!



At OTARI, this is not just a claim, but a reality brought by the application of the highest standards of technology and precision. And adherence to these standards by OTARI sound specialists has resulted in an even greater lineup of full capability, professional tape recorders in compact packages with all the performance, features, and reliability you expect from more expensive machines.

Now OTARI offers a full line of durable yet precise performers in the one to eight track, 1/4-inch to 1-inch range, with lowest possible wow and flutter, and the highest possible S/N ratio at cost YOU can afford. OTARI's rugged, dependable machines have satisfied hard-to-please production and broadcasting studios and professional musicians for years. Why not let them serve YOUR sound recording needs?

●**MX 5050 2S**
* Exceptional S/N ratio and crosstalk
* Motion sensing control logic prevents tape damage
* Selective reproduce for overdubbing (standard)
* Front accessible bias, EQ, and operating level
* Built-in test and cue oscillator
* Professional 600 ohm + 4 dB outputs and XLR connectors.
Front panel edit and cue controls
DC servo capstan option

Four heads
Bias adjustable for new high energy master tapes
●**MX 5050 8SD**
* 1/2-inch eight channel recorder
* XLR line input and output connectors
* Test and calibration oscillator
* Variable speed DC servo capstan
* Plug-in card electronics and head assembly
Motion sensing control logic prevents tape damage

Selective reproduce on all channels
Interface jack for dbx and Dolby
Accessible heads, minute and second counter
Front adjustable cue and edit control
Easily accessible electronics adjustments
Also available in four channel 1/4" and 1/2" MX 5050 QXD

*Exclusive OTARI features

OTARI®

Contact OTARI today for full information

Otari Electric Co., Ltd., Otari Bldg., 4-29-18, Minami Ogikubo, Sugi-nami-ku, Tokyo 167, Japan. Phone: (03)333—9631

U. S. A.: Otari Corporation, 981 Industrial Road, San Carlos, California 94070, Phone: 415 593—1648

●**Canada**: Noresco Manifacturing Co., Ltd., 100 Floral Parkway, Toront, Ontario M6L2C5 Phone (416) 249—7316
●**U. K.**: C. E. Hammond & Co., Ltd. 105/109 Oyster Lane, Byfleet, Surrey KT14 7LA, Phone: Byfleet 41131
●**France**: Reditec 62-66, Rue Louis Ampère(Zone Industrielle des Chanoux), 93360 Neuilly-Plaisance, Phone: 935—9786
●**Belgium**: Trans European Music S. A. Koeivijverstraat 105, 1710 Dilbeek, Phone: (02) 569 1823
●**Netherlands**: Selectronic B. V. Sluisplein 3—4, Ouderkerk aan de Amstel, Postbus 28, Phone: 02963/4838/4966
●**Australia**: Klarion Enterprises (Pty.) Ltd. Regent House, 63 Kingsway, South Melbourne, 3205, Phone: 61 3801
●**Singapore**: Otarl Electric Co., Ltd., Singapore Representative Office, 2701—A 27th Floor, International Plaza, Anson Road, Singapore (2)

Circle 225 on Reader Service Card

Great Ideas

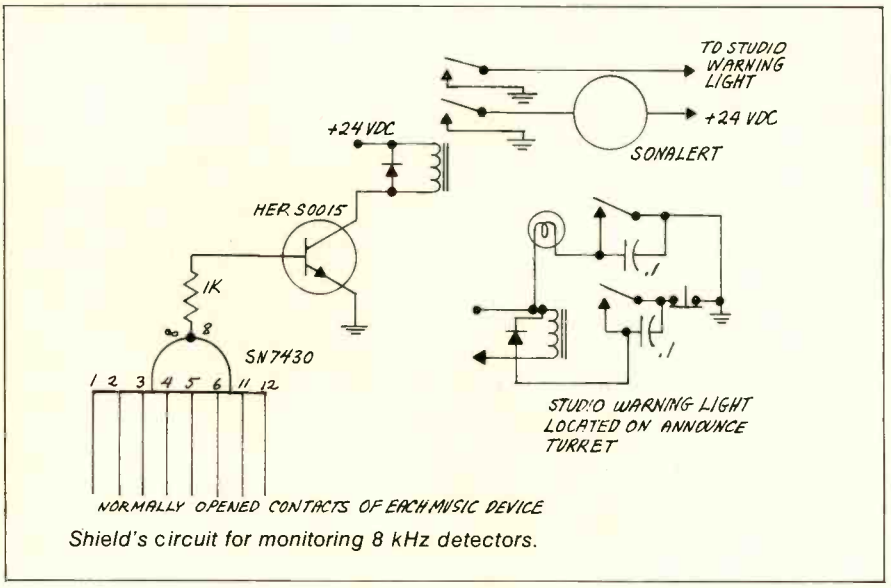
2. Monitoring The Operation Of 8kHz Tone Detectors.

Robert N. Shields, Jr., Tech. Supervisor, WCAU-FM, Philadelphia, PA

Problem: How to monitor the operation of all the tertiary tone detectors in our IGM system 770, without effecting the operation by using a common alarm.

Solution: We have eight Insta cart machines with 8 kHz detectors. The 8kHz tone is used to trigger the voice tracks. An eight input band gate is used to isolate all of the insta cart detectors. The input of each gate is connected to the N.O. contacts of the tone detectors. The detectors drive TTL logic in the system so no form of interfacing is needed. Five volts are present on the N.O. contacts until a tone is detected in that Insta cart. When that happens, the voltage goes to zero. With a nand gate, any low input will produce a high output. This high, about 5 volts, drives the base of the transistor into saturation, causing it to conduct, pulling in the 24 volt relay.

At first, the relay was just to drive the sonalert, which can be driven directly by the transistor, but after using this device for a while, a second and more important use was found. An extra set of contacts was used to trigger a latch type relay in the air studio so that when live, the talent could be made aware of the fact that the song was about to end.



Shield's circuit for monitoring 8 kHz detectors.

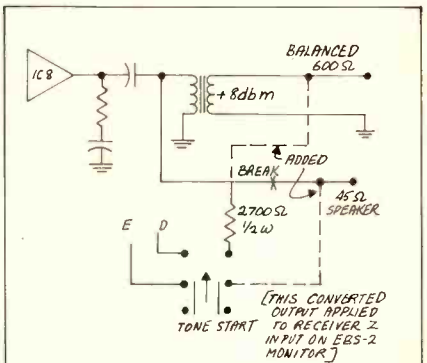
3. Convenient Checking Of EBS System.

Keith Harrison, Engineer, WRAL-TV/FM, Raleigh, NC

Problem: Following installation of the new EBS equipment, a need was found for locally testing both encoder and decoder as conveniently as possible to promote frequent checks. The decoder already permits testing the audio monitor section but not the decoding network. The following arrangement easily accomplishes the job plus provides a check of the encoder-generator.

Solution: The tone generator is sampled through a controlled output applied to the second receiver input on the decoder-monitor. This provides a closed loop test of both generator output and monitor from the input of the decoder network.

The McMartin TG-2 tone generator uses one half of a DPDT momentary switch to activate the timing sequence. The remaining N.O. Contacts provide a controlled sample of the tones by looping a sample of the output through



McMartin TG-2 tone generator to activate the timing sequence of Harrison's EBS checking system.

the contacts, as in the schematic. This output is applied to the Receiver 2 input on the McMartin EBS-2 monitor.

A test is conducted by pressing the tone start switch for 15-20 seconds, or until the decoder responds. When it does respond, the tones will be heard, along with the audio from the receiver assigned to Receiver 1 input. Lack of any response from the monitor would indicate a need for checking the equipment before failing to receive a test or before attempting an on-air test.

4. Auxillary Phone/Speaker Amplifier.

Evert Fruitman, Engineer, KOOL, Phoenix, AZ

Problem: Low level audio from wireless microphone receiver. That new high quality wireless microphone receiver provided almost enough audio to see on the VU meter; but nowhere near enough to hear even if the 50,000 football fans were more or less quiet.

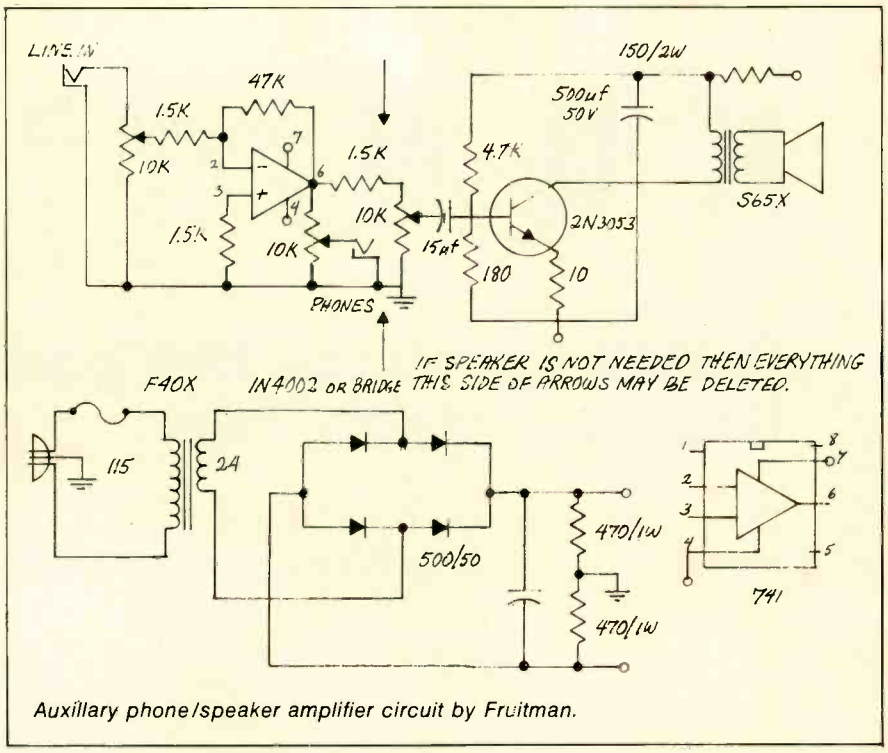
Solution: The figures show what turned out to be a quick and simple solution. The op-amp gives about 30 dB of gain, which more than makes up for the lack at the receiver output. The class A speaker amplifier takes up relatively little space and provides more than enough audio for those in the press box who don't want to be saddled with earphones but still want to catch the comments from the field prior to airing.

The 741 will drive 1000 ohm phones to distraction. A matching transformer should be used for lower output impedences.

A split power supply is avoided by the use of the two 470 ohm resistors. If the speaker part is not needed, then everything to the right of the arrows may be deleted.

The amplifier, power supply, and loudspeaker were mounted in a 3 × 5 × 7 inch box. Much of the front panel space was taken up by the speaker, however, there was quite a bit of space left over in the rest of the box.

This amplifier has been in use here at KOOL for quite some time and has given satisfactory results.



Auxillary phone/speaker amplifier circuit by Fruitman.

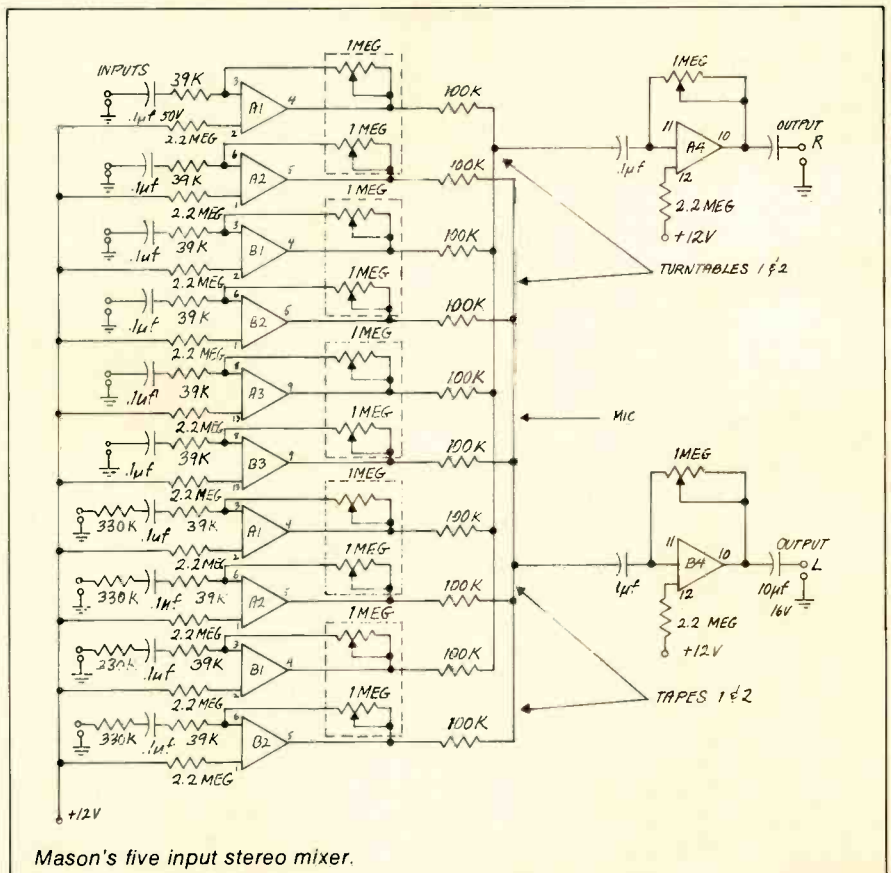
5. Inexpensive Broadcast-Quality Mixer.

Walter Mason, Assoc. Eng., WTFM. Fresh Meadows, NY

Problem: To fill a need for an inexpensive broadcast-quality mixer with provisions for custom equalization.

Solution: So audio buffs could use it, I designed this five input stereo mixer using an inexpensive surplus I.C. op-amp. I used the LM3900 quad "Norton" op-amp because among other things, it needs only a single power supply as opposed to the dual supply requirements of most op-amps.

By experimenting with various components in the feed back loop, I was able to achieve the frequency equalization I desired. I used inexpensive stereo pre-amps for the turntables and a small transistorized battery operated (for isolation) amplifier for cue. A 1 amp 12V power (well regulated) was used for the mixer. The total cost came to $125.00.



Mason's five input stereo mixer.

INTERPRETING THE FCC RULES & REGULATIONS

Commission Amends Emergency Broadcast System Rules

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

SEVERAL RECENT DEVELOPMENTS have precipitated amendments to the Commission's Emergency Broadcast System (EBS) Rules.* After a great deal of study, the National Industry Advisory Committee's (NIAC) Broadcast Services Subcommittee recommended significant changes to conform the EBS Rules to the current state of communications technology. Introduction of the two-tone Attention Signal in August 1975 dictated some additional Rule changes. Finally, increasing emphasis upon *local* level use of the EBS for day-to-day emergency calls required procedural rule changes.

Alternate Stations, Alternate Relay Stations Deleted

In the past, the EBS Rules required alternate stations to go off the air during any national emergency. (Primary and primary relay stations were charged with broadcasting emergency programming to the public and relaying such programming to other radio stations.) Alternate stations could not return to the air unless the key EBS stations became unoperational. If this occurred, the alternate stations would assume the key stations' role and broadcast emergency programming.

The Commission *deleted* the designation of alternate stations and alternate relay stations based, in part, upon an NIAC Subcommittee recommendation "to allow as many stations as possible to remain on the air broadcasting emergency programming to their listeners."

Originating Primary Relay Stations

> The Commission defines a State Relay Network as: ". . . a relay network composed of Primary Relay Stations and leased common carrier communications facilities, for disseminating statewide emergency programming originated by the Governor or a designated representative."

The State Relay Network must have an origination point. For this reason, the Commission developed a new category of station, designated the "Originating Primary Relay Station," to cover all stations presently operating as the *entry* point to the State level EBS. In many instances, this station is located in the State capital. This assures that the Governor will have ready communication with the citizens of the State.

Originating primary relay stations *and* primary relay, relay stations *differ* from primary stations in that the former must be part of the State Relay Network and must relay emergency programming to other stations. Direct public reception of such transmissions is *ancillary* to these relay station's primary purpose. On the other hand, the EBS transmissions of primary stations are *intended* for direct public reception, with the relay function being of secondary importance.

EBS Programming Priorities

As deletion of alternate stations and alternate relay stations indicates, the Commission has shifted EBS programming emphasis to *local* level programming. The NIAC Broadcasting Subcommittee recommended this change from State level programming because "local level emergency information is of more concern and has greater relevance to listening audiences than state level emergency information." This rational appears sound in light of the significantly greater incidence of local emergency occurrances (e.g., tornado, flood, blizzard, etc.).

National Level Activation

In the past, AT&T had the capability to reconfigure all networks for National Level EBS activation in time of national emergency. This is no longer true with the advent of other common carriers into the network feed business via the use of satellites. Therefore, the Commission deleted all references to AT&T in the EBS Rules and substituted references to "participating communications common carriers."

At the same time, the Commission heeded the NIAC Subcommittee's recommendation and deleted the requirement that communications common carriers determine whether stations hold an EBS Authorization. These carriers may now connect *any* independent station with a network until termination of a national level EBS activation.

Monitoring Equipment Location

When the Commission added the two-tone Attention Signal recently, the requirement that EBS monitoring equipment be located at the transmitter control point was

continued on page 00

*Sections 73.901-73.962 and selected other provisions of the Broadcast Services Rules.

FCC Rules And Regulations

eliminated. This was possible because elimination of the carrier-break ended the *need* to do so. Henceforth, EBS monitoring equipment may be located at the transmitter control point *or* at the studio location where programming takes place. In the case of co-owned and co-located stations (an AM-FM combination) only one receiver need be installed *if* the two stations share combined studio facilities.

As with EBS monitoring equipment, equipment capable of transmitting the EBS Attention Signal (used to alert other stations of National, state or local EBS activitation) may be located at a station's transmitter control point *or* studio facilities location. Station personnel must be able to easily initiate the two-tone Attention Signal regardless of the equipment's location. Again, AM-FM combinations that share studio facilities need only install one signal generator.

Station personnel must maintain the equipment that monitors and generates the EBS Attention Signal in working order during broadcasting hours. The same personnel are responsible for ferreting out the reasons for any failure by the station to receive EBS Weekly Transmission Tests.

One final change has been made in this area. Stations may continue to operate without EBS monitoring and generating equipment (both for the Attention Signal and for emergency programming) for up to 60 days *without* securing Commission authorization *if* the equipment becomes defective and the station:

(1) Notes the reason for not receiving and conducting the Weekly Test Transmission (i.e., notes the equipment defect in the operating or program log) and;

(2) logs the dates and times that the equipment is removed from and restored to service.

In the event the equipment cannot be restored to service within 60 days, the station must make an "informal request" for more time to the FCC Engineer in Charge of the radio district within which the station is located.

Operating and Program Logs

As noted above, receipt and transmission of the Weekly EBS tests must be logged in the operating or program log. The station may choose either log, but must make the entries *consistently* in one or the other.

Weekly Transmission Tests

The Commission denied requests that *weekly* EBS tests be replaced by *monthly* tests. However, stations may now substitute "coordinated tests of EBS operational procedures for an entire State or Operational (Local) Area" for the Weekly Transmission Tests.

Conclusion

The Commission publishes an EBS Checklist which shows in detailed but simple to follow form the procedures that a station must follow during the Weekly Transmission Tests as well as during actual emergency activations. As this article goes to print, the Commission is revising the EBS checklist to take into account (1) adoption of the new two-tone Attention Signal and (2) changes discussed above, such as deletion of alternate primary and alternate relay stations. Two EBS checklists will be published. One will apply to all stations that participate in the Emergency Broadcasting System (i.e., 9,500 stations—or more than 95% of all on-the-air-stations.) The other will apply to all non-participating stations. The Commission will send copies directly to all stations soon, if it has not already done so. **BM/E**

® U.S. Registration No. 1,047,050.

The Hitachi SATICON, a newly-developed camera tube, is characterized by heterojunction target between tin-oxide and selenium doped with arsenic and tellurium in its photo-conductive layer.

Model H8397 is the first in the SATICON series, a small 2/3 inch high-performance tube that is particularly suited for hand-held color television cameras. Size and weight are significantly reduced with no impairment in picture quality or color. In the studio or out on the field. The Hitachi SATICON makes for easy versatile on-site TV broadcasting.

The Hitachi SATICON H8397 offers these excellent features:

High resolution – amplitude response of nominal 45% at 400/TV lines.

Low reflection coefficient of photo conductor throughout the entire visible light range – eliminates flare and the need for a flare tip.

Well-balanced, highly sensitive spectral response – no R.G.B. tube selection required.

Low lag – almost zero with bias light.

HITACHI

Hitachi, Ltd. Electronics Devices Group
6-2, 2-chome, Otemachi, Chiyoda-ku, Tokyo 100
Telephone: Tokyo (270) 2111 Cable Address: "HITACHY" TOKYO
Telex: J22395, 22432, 24491, 26375

For inquiry write to: Hitachi America, Ltd.
Chicago Office, Electronics Department
2700 River Road, Des Plaines, Illinois 60018
Telephone: (312) 298-0840 Telex: 72-6353

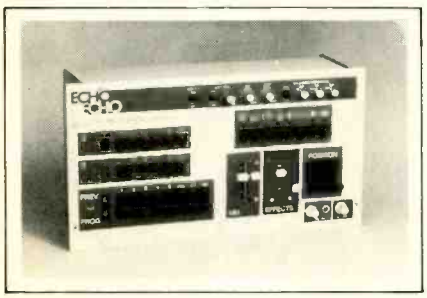
Circle 238 on Reader Service Card

BROADCAST EQUIPMENT

For more information circle bold face numbers on reader service card.

Special Effects Generator 300

Designed primarily for small-studio and mobile-studio use, full-color special effects generator can be used on a direct, plug-in basis with Sony cameras, without adapter cables or extra boxes. Model SE/2 has four subcarrier phase shifters, four sync distribution amplifiers and tally and drivers



built in. Soft-touch switching is all in the vertical interval. Effects include positionable circle and square, rotatable diagonal, four corners, key/mat and double re-entrants. Background generator produces monochrome or color. Preview bus selects any signal for preview, system fades to previewed signal. $3750. ECHOLAB, INC.

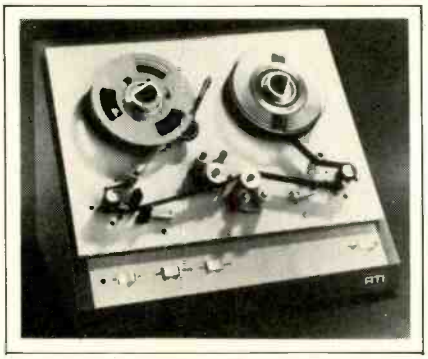
FM Exciter/Transmitter 301

Single frequency, synthesized design allows flexibility in choice of frequency in FM exciter/transmitter with 10-watt output. Model V-322 has all digital,

integrated circuit with phase-lock loop. Modular construction allows quick conversion to stereo at any time. Direct modulation; distortion typically less than 0.1%; frequency response — +¼ −½ dB 30 Hz-15 kHz; carrier stability ±250 Hz. $1929.50. VERSA COUNT.

Video Tape Conditioner 302

Machine burnishes and polishes the oxide surface of video tape, removing dirt, chips, loose particles. The Retec video tape conditioner reduces drop-



outs as much as 70%. It runs a 10½ inch reel through in less than four minutes, without solvents and without affecting any program recorded on the tape. It is available for tape 1.5 or 1.0 mils thick and ½, 1, and 2 inches wide. RESEARCH TECHNOLOGY, INC.

Video Cassette Changer 303

A video cassette changer for stand-alone pay TV installations handles a full week's pay TV programming. System 19 automatically switches and changes up to 19 different cassettes at any time, in any order. The system, in a single six-foot rack, includes two Sony U-matic video tape players, monitor, time base corrector, and 19 cassette trays, along with a master control system, external video and audio switching, time clock and stand-by battery with charger. PROGRAMMABLE SYSTEMS, INC.

Long-Life Ferrite Head 304

Ferrite replacement head for broadcast cart machines uses hot-pressed ferrite

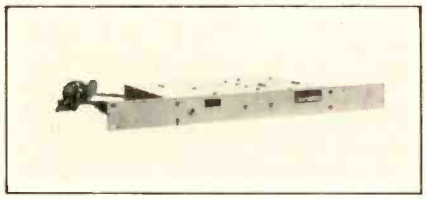
with glass-bonded gaps. It is plug-to-plug compatible with original metal heads in the specified cart machines. Life expectancy 10 times that of the original heads is said by maker to be conservative. SAKI MAGNETICS.

Multichannel Recorders 305

Portable tape recorders in four-channel and eight-channel versions are designed for instrumentation applications. The Series SE Eight-Four are available with three speeds in any one recorder, which may be 30 ips or 15 ips plus any two of 7½, 3¾, and 1⅞, or 30 ips and 15 ips plus one other. Velocity-feedback servo maintains tape speed at better than 0.25%; flutter is typically 0.35% peak to peak; direct recording bandwidth at 15 ips is 60 kHz, FM bandwidth DC to 5 kHz. Calibration system is built in. Weight, 25 lbs. for four channel, 30 pounds for eight channels. $5,473 to $8,582. EMI TECHNOLOGY, INC.

25 Hz Suppression Filter 307

A 25 Hz tone suppression filter introduces 20 dB of loss. Model APS-10 has less than 1 dB of suppression at 50



Hz. It is a dual rack mounted unit, includes the power supplies, accepts 600 ohm floating signals. $500. A.P. CIRCUIT CORP.

Wire And Cable Holder 308

Nylon wire and cable holder has a free-swinging gate that prevents unintentional cable exit. Units come in four sizes with internal space 7/16 in. wide and ranging from 11/64 to 1-1/16 long. They snap lock into panel holes for anchoring. HEYMAN MFG. CO.

Low Lite CCTV Camera 309

Video camera for CCTV applications has automatic light compensation of

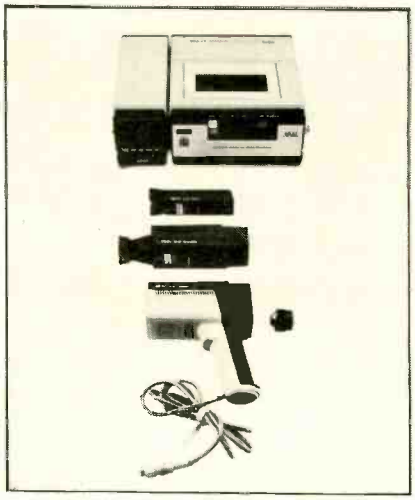
continued on page 182

Broadcast Equipment

500,000:1. Model TD3400 delivers a usable picture with .005 foot candles of illumination. Resolution is 600 lines; there is a white clip circuit and externally adjustable beam and focus control. GBC CCTV CORP.

Monochrome Video Cassette 306

One-half inch black and white video cassette system consists of 14 pound recorder, VT-300 with detachable 3-inch monitor; and the VC-300 high



resolution camera with 16mm lens, with detachable optical view finder and optional electronic view finder. AKAI AMERICA, LTD.

Cable-Incorporated Filter 311

Filter for VHF and UHF frequencies up to 1 GHz is in form like a short length of coaxial cable; it is tough and pliable, interconnects as the cable does. Band-pass and band-reject versions are available; the latter have rejection in excess of 100 dB. VITEK ELECTRONICS, INC.

High Voltage Supplies 312

New series uses RF oscillator with ferrite core transformer, claimed to have lower power loss, and fewer failure modes, than air-core designs. Series GHV-150 have inherent automatic self protection against damage from shorts, etc.; regulation better than ±0.05%; ripple less than 0.1%; typical efficiency of 80% at full load. Voltage ranges are up to 60 KV, current to 2.5 mA. GLASSMAN HIGH VOLTAGE CO.

Extension For Mic Booms 313

A variable length extension tube increases microphone floor-stand height, or widens the reach of horizontal boom

attachments. Model EB-20 adds up to 20 ins. to height or length. It incorporates a grip-action clutch and a standard ⅝ in.—27 male thread for microphone attachment. ATLAS SOUND.

Zoom Finder For Film, Cameras 310

Director's zoom finder has been recalibrated to include all widescreen formats and film ratios. The Model IIIB

35/16mm finder has scale on the barrel to simplify selection of lenses. It can show what a camera "sees" with its present lenses, and indicate what lens should be used for the composition wanted. $149.50. ALAN GORDON ENTERPRISES.

Modulation Meter For 2 GHz 329

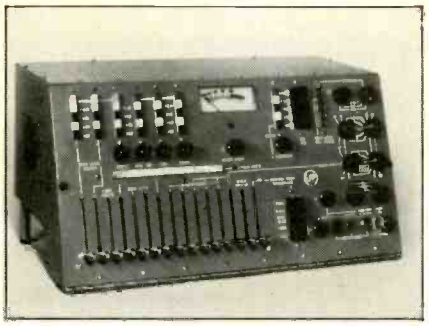
Automatic measurement of modulation of AM and FM signals with carrier frequencies from 1.5 MHz to 2 GHz is carried out in about one second by new modulation meter. Model 208 tunes itself to the carrier frequency, lights a lock lamp, adjusts the input and displays the modulation depth or frequency deviation on a front-panel meter. Peak and trough amplitudes on AM, peak positive and negative deviation on FM, in addition to the mean of either, can be displayed. FM deviation is in eight ranges from 1.5 kHz to 100 kHz, AM in six ranges from 5% to 100%. Ranges can always be chosen for reading in the high-accuracy upper part of meter scale. Optional battery pack provides six hours continuous operation. DATA TECH.

Counter For 1 Hz to 500 MHz 330

Counter has full 8 digit display, prescaler, accuracy of ±.0002% for range 1 Hz to 500 MHz. Model CTR-2 has automatic input limiting, selectable gate times of 1 ms and 1 sec., and a 10 MHz TCXO time base. $349.95. DAVIS ELECTRONICS.

Audio Mixer-Master Control 314

Audio mixer/master control for TV studios accepts 13 high and low level sources. Model MS-105 has group



mastering, auditioning of mics and high level sources, variable equalization, reverb circuit, compression, cueing, testone, voice-over ducking, stage paging. Master control allows airing one program while recording another. ULTRA AUDIO PRODUCTS.

Split Lens For TV Camera 315

Split lens allows low-light-level, ultra sensitive camera tube to show two different scenes, with different magnification on one camera, one monitor. Model TL 155 provides two views, horizontally or vertically split; they can be 180 degrees apart, forward, backward or angled to one side. Lens has neutral density filters and automatic iris controlled by the video signal. Designed for "C" mounts. VISUAL METHODS INC.

Shielded Jacketing For Cables 316

Flexible, shielded jacketing wraps around cable and is closed by "zipping" the track shut. It is available in general purpose coat; Mil Spec Polyvinyl chloride; or extreme-temperature Teflon. Shielding layer may be three mil aluminum foil, copper-clad wire mesh, or anti-magnetic high nickel steel foil. Full-length tinned copper braid allows soldered grounding. ZIPPERTUBING CO.

A Selection Of New Test Gear

The last year has seen a widening flood of new test equipment, including new kinds of test equipment, reaching the market from old and new suppliers. The following is a sampler of new test units from firms not exhibiting at the NAB.

Counter For GHz Band 317

Eleven-digit counter covers 200 MHz to 24 GHz. Model 6054B makes automatic microwave measurements to 24 GHz, has sensitivity of −20 dBm in the 18-24 GHz range, accepts signals with high FM, tracks rapidly changing frequencies, has built-in warning and protection against high power inputs. $6,200. SYSTRON-DONNER.

For more information circle bold face numbers on reader service card.

Transfer-Standard DVM 318

Digital voltmeter with 7 digit readout has 1 ppm linearity, 2 ppm stability, and resolution to 1 microvolt. Model SM215 dc voltage transfer standard dvm uses two A/D conversion techniques: the most significant decades by an inductive potentiometric division system with accuracies to 2 parts in 10^8, the less significant decades by conventional dual-ramp technique. This combines very high accuracy with wide operating range, high noise rejection, and convenient size. Range is to 1100 volts DC, in four ranges selectable manually or by autoranging. Overall accuracy is 0.001% of reading ±0.0001% of full scale. Outputs are included for digital printout. Input impedance is at least 100,000 megohms up to 11 volts and 10 megohms above.

Panel selectable filter provides extraneous signal rejection, 60 dB (out) or 90 dB (in). $6,700. EMI TECHNOLOGY, INC.

Spectrum Analyzer 319

Real-time spectrum analyzer has a narrow-band power readout for power measurements over the full range of 0 to 100 kHz. Model FET 512S-17 displays measurements in VRMS, VRMS², or dBv. It has single 400 or 200 line resolution. A difference mode shows difference in amplitude between two 200-line averaged spectra, with active storage of both, for signal and signal-plus-noise measurements. It is compatible with ⅓ octave filters; has annotated cursor for absolute and relative amplitudes, frequency, harmonics, sidebands; input from ⅓ microvolt to 32 v rms. $9,875. ROCKLAND SYSTEMS CORP.

Counter/Timer 320

Programmable factoring counter timers have digital control of the program factor, six digit readout. 8150 Series is programmed by front panel thumbwheels, or rear connector jumpers. Factoring range is 10 microsec to 100 seconds in 10 microsec steps. All six models have input shaping circuits to allow for any amplitude, 10 mV to 170 v rms and any waveshape, dc to 1 MHz. Unit will count, totalize or time and supply a direct or factored digital readout in selected units. Options include switch selectable input multipliers of X10, X100 and X1000. $375. DIGITEC CO.

Octave-Band Filter 321

Octave band filter set meets ANSI S1.11 and plugs into Scott 452 sound level meter. Model 462 has independent amplifier with 10,20 and 30 dB gain control, a separate meter to read octave band level concurrently with total sound pressure level, and compensation for C weighting for flat response, 20 Hz to 15 kHz. $400. SCOTT INSTRUMENT LABORATORIES.

Analog Option For DMM 322

Edge-type panel analog indicator is introduced as an option for the 3028A digital multimeter, to allow for peaking and nulling operations. Option 20 meter is calibrated to track at full scale with the full scale digital readout. It also has a dB scale with 0 dB at 1 mW into 1000 ohms. The DMM itself has six functions and 30 ranges, 3½ digit readout, rms response on distorted waveforms, bandwidth 15 Hz to 110 kHz, operates on ac or battery. Model 3028A, $279; Option 20, $65. BALLANTINE LABORATORIES.

Slim Oscilloscope Probe 326

Probe for oscilloscopes has slim body construction, 10:1 and direct capability. Model PR-35 has impedance of 10 megohms/18pf at 10:1 and 1 megohm/120 pf at 1:1. It is designed for any scope with BNC connectors and having bandwidth to 15 MHz and input capacitance of 10 to 35 pf. $30. B&K PRECISION (DYNASCAN).

Cable Sweep 328

A flat, ALC-controlled sweep is produced by new unit, over range from 1 MHz to 300 MHz. Model 9059 has sweep rate variable from 2 to 10 ms; time can be varied from 1 sweep every 20 ms (50 Hz) to 1 sweep or scan every 8 seconds. Start/stop controls can be set to band edges to limit sweep to wanted bandwidth. Output is up to +60 dBmV RF from 1 MHz to 300 MHz, flat to ±0.25 dB. CW output is available for initial level setting. Optional are frequency markers, precision attenuator. $845. KAY ELEMETRICS.

Advertisers Index

SALES OFFICES

Broadband Information Services, Inc.

295 Madison Ave.
New York, New York 10017

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

WESTERN STATES
1212 Hearst Building
San Francisco, California 94103
415-495-0990
William J. Healey

P.O. Box 49206
Los Angeles, California 90049
213-826-4543
Art Mandell

MCC7602

the McCurdy package

The McCurdy Package offers exceptional user flexibility. Individual components are designed to integrate and expand in accordance with future needs.

Our systems engineering is backed by 28 years of experience in building quality equipment for the country's leading stations.

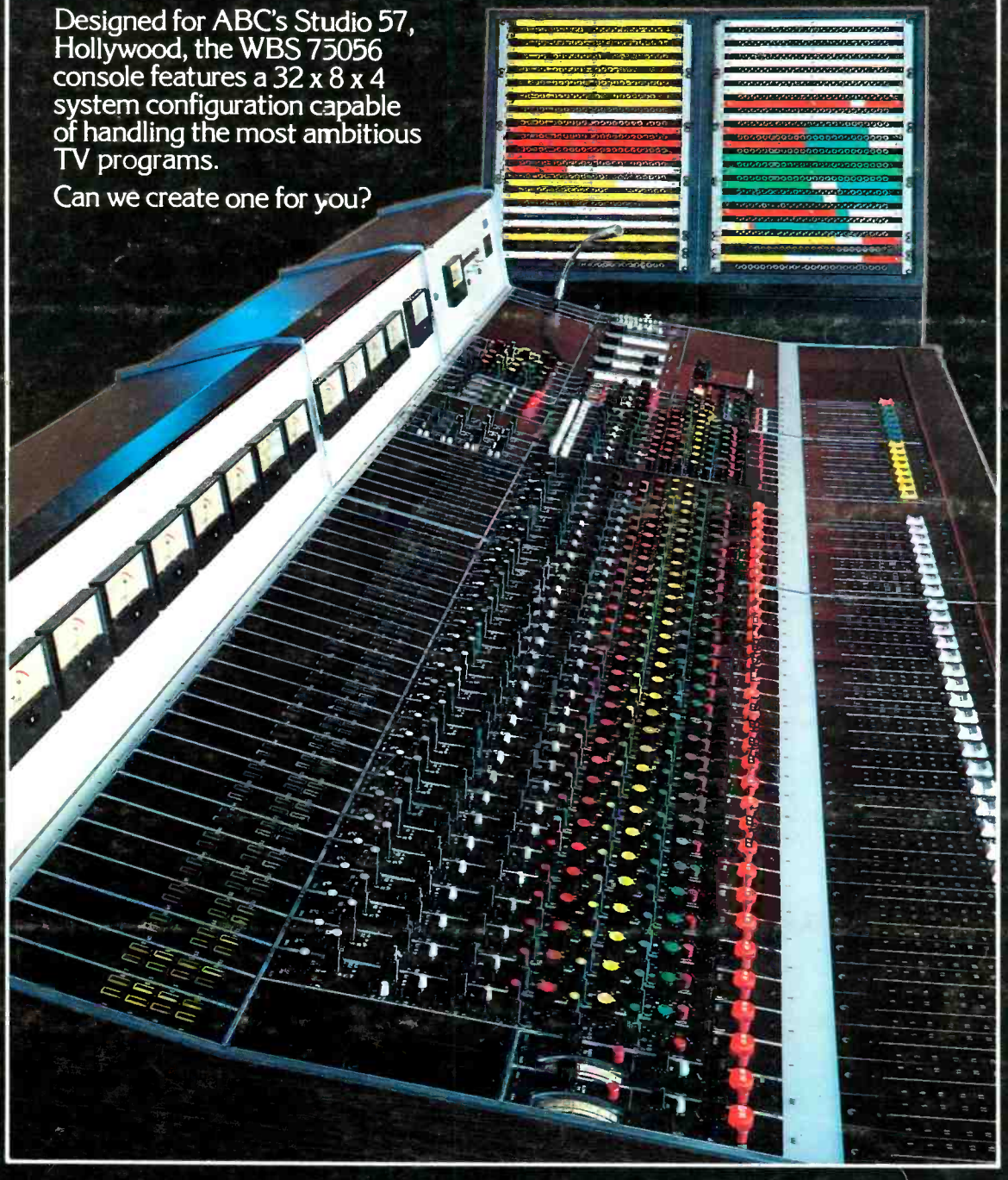
McCURDY RADIO INDUSTRIES INCORPORATED, 1051 CLINTON STREET, BUFFALO, NEW YORK 14206 (716) 854-6700 TWX 610-492-3279
McCURDY RADIO INDUSTRIES INCORPORATED, SADDLE RIVER, NEW JERSEY P.O. BOX 86, 07453 (201) 327-0750 TWX 610-492-3279
McCURDY RADIO INDUSTRIES LIMITED, 108 CARNFORTH ROAD, TORONTO, ONTARIO, CANADA M4A 2L4 (416) 751-6262 TELEX 06-963533

Circle 249 on Reader Service Card

A new measure of excellence by Ward-Beck.

Designed for ABC's Studio 57, Hollywood, the WBS 75056 console features a 32 x 8 x 4 system configuration capable of handling the most ambitious TV programs.

Can we create one for you?



WBS

Tomorrow's Technology Today.

Ward-Beck Systems Ltd., 841 Progress Avenue, Scarborough, Ontario M1H 2X4.
Telephone (416) 438-6550. Telex 06-23469.

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

Circle 250 on Reader Service Card