BME

FOR TECHNICAL AND ENGINEERING MANAGEMENT

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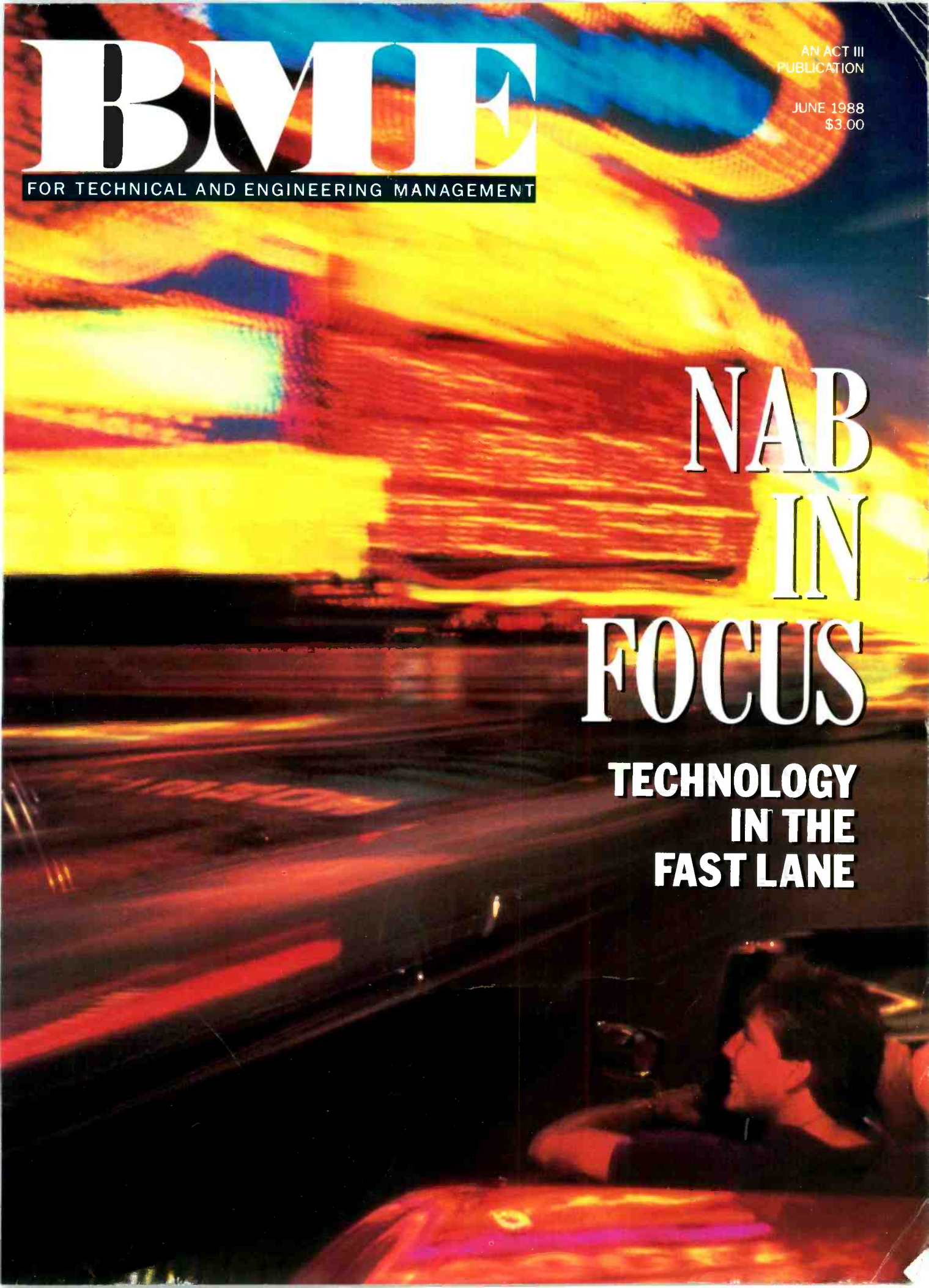

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STUDER REVOX

Circle 100 on Reader Service Card Page 91

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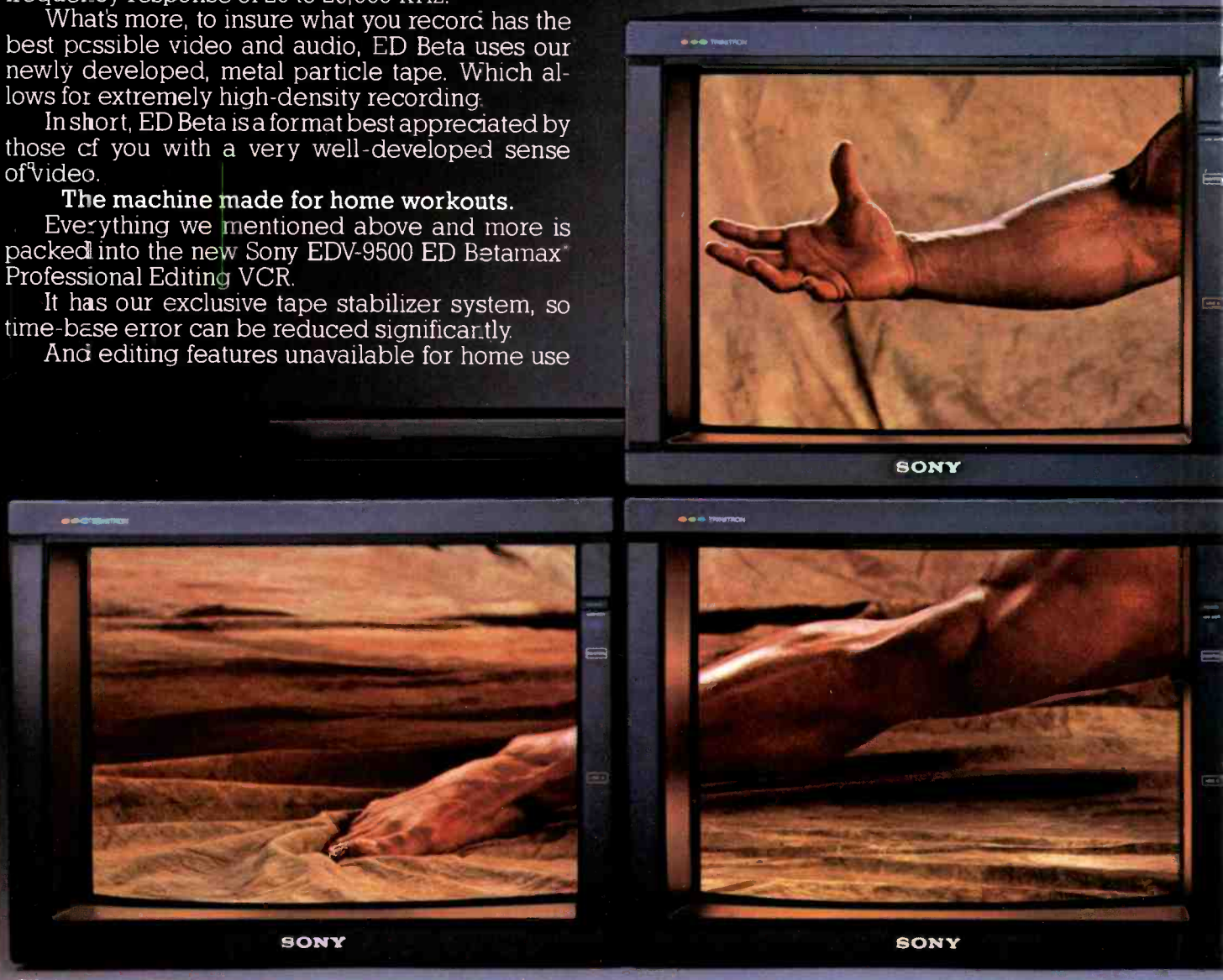

TV picture simulated.

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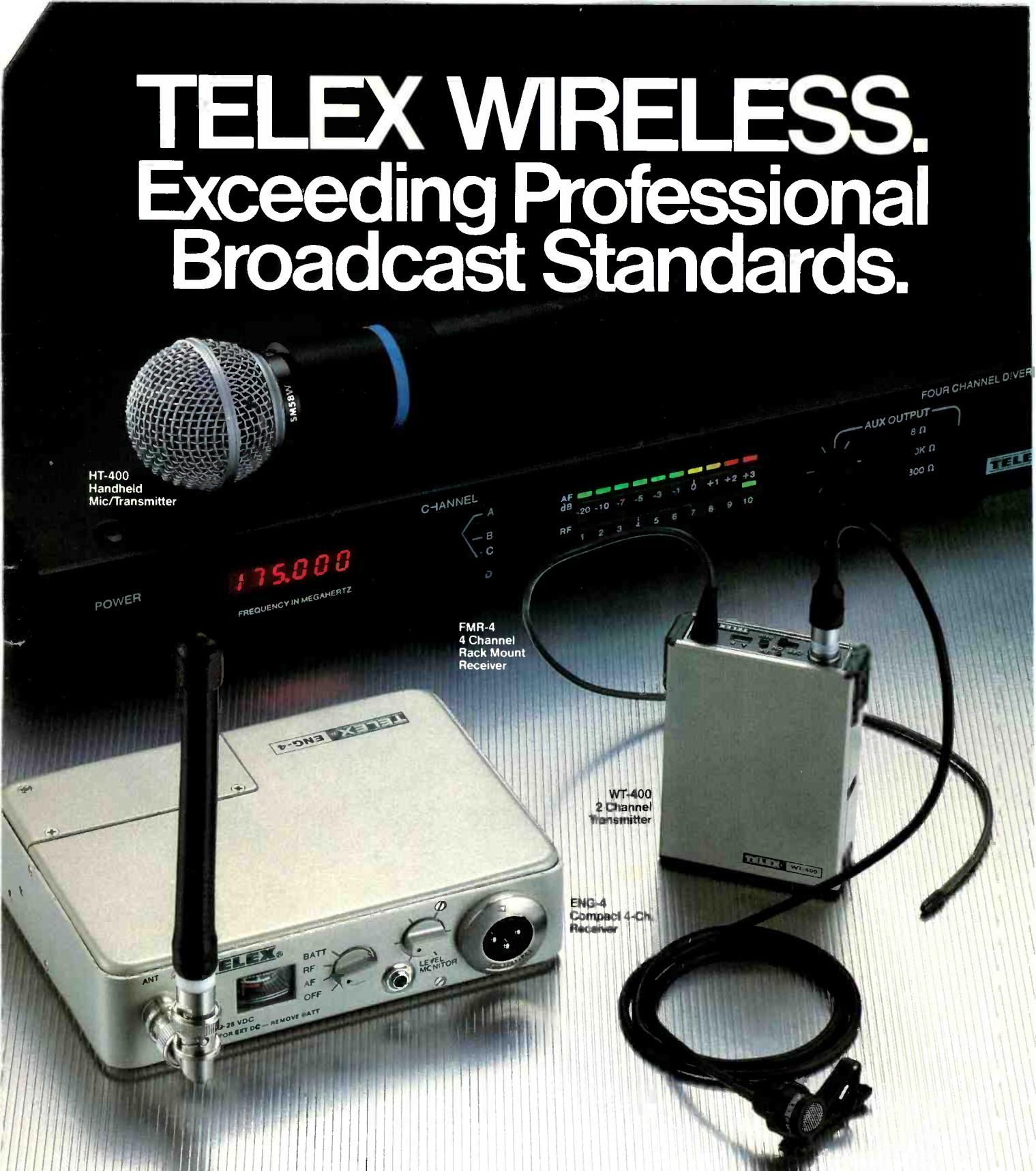
Exceeding Professional Broadcast Standards.



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Our wireless microphone systems have been designed to stand up to the rigors of difficult remote ENG news assignments as well as the daily abuse of studio use. Call or write for detailed information. Telex Communications, Inc., 9600 Aldrich Ave. S., Minneapolis, MN 55420

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BME
FOR TECHNICAL AND ENGINEERING MANAGEMENT
JUNE 1988
VOL. 24, NO. 6

On the cover:
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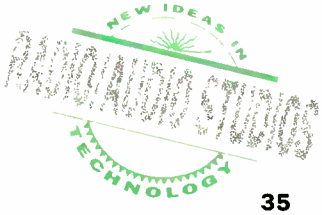

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Merrill Weiss, director of advanced television, NBC
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New Products at NAB
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Features

Championship Performance.

For a champion, being the best is not enough, You never stop trying to be just a little better. To move the standard a little higher. To make even the most difficult achievements seem easy.

So it is with the Model 300 production system, the recognized world standard. Now in more than 800 installations worldwide, the Model 300 continues to offer you more.

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— drop shadow
— soft border
— Omni-Key™ linear keying (using Model 300)

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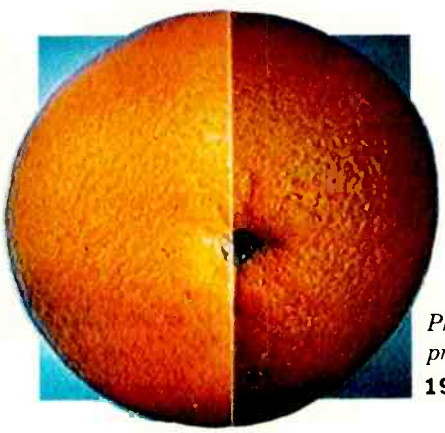

Philips' HDS-NA process
19

JVC's CHIP CAMERAS LET YOU PLANT A FOOT FIRMLY, IN ALL THREE CONFIGURATIONS... WITHOUT EVER BREAKING STRIDE.

FROM STUDIO TO PORTABLE TO CAMCORDER... JVC's 3-CCD CAMERAS, THE KY-20U AND KY-15U...THE PERFECT FIT!

With all their features, JVC's KY-20U and the KY-15U are steps ahead of the other chip cameras. In fact, they're a hop, skip, and a jump from studio to portable to camcorder configurations.

The easy-to-handle size and weight make them truly mobile one-man operations that walk tall in ENG/EFP environments. But handling is just part of the story. They are designed for rugged, durable use and have solid state pick-up systems that provide high levels of stability.

The KY-20U and KY-15U cameras are laced with features that give you that step in time when you need it. The KY-20U employs a ⅔" CCD to give you 380,000 pixels for a horizontal resolution of 530 lines while the KY-15U is designed with a ½" CCD for 360,000 pixels and a horizontal resolution of 500 lines. Both the KY-20U and the KY-15U have a signal-to-noise ratio of 58 dB. Specs which put you a giant step ahead in high quality video. When it comes to true flexibility, mobility and capability these CCD cameras far outpace the rest of the field.

The KY-15U can dock directly with the BR-S410U, S-VHS recorder. The KY-20U can dock with the KR-M260U, MII recorder (with the optional KA-M20U adapter), and in studio or portable configurations will integrate with a variety of formats.

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For literature or a camera-in-use demonstration call toll free: 1-800-JVC-5825. JVC PROFESSIONAL PRODUCTS COMPANY, 41 Slater Drive, Elmwood Park, New Jersey 07407.

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Circle 104 on Reader Service Card Page 91

THE FUTURE OF UHF TELEVISION HAS ARRIVED ...

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Best of all, these transmitters are in production now! Call your regional sales office for a firm price and delivery quotation.

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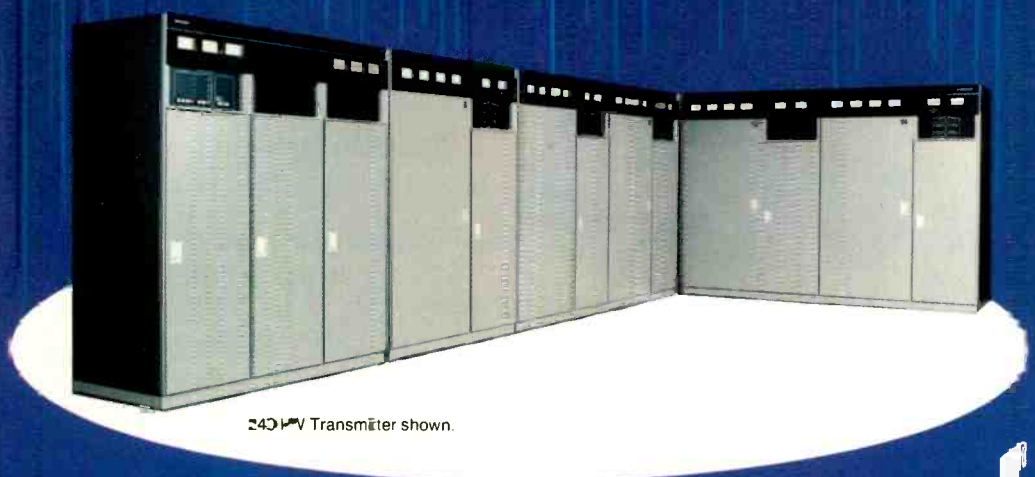

240 kW Transmitter shown.

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VIEWPOINT

They say that everything that lives is growing . . . welcome to the new BME.

They say that everything that lives is growing, changing. And so we present the new *BME*, in a modernized style and format expressly created to fulfill the information needs of technical and engineering management at radio and TV stations and teleproduction facilities alike.

As you look through this issue, many of the changes will be immediately apparent. We have, for the past several months, been adding a number of new departments: Spectrum: The Regulatory Environment; Currents: A Guest Editorial, written each month by your fellow engineers expressing their own ideas about trends in the industry; Crosstalk: An Engineering Management Journal and Compute, about PCs in the engineering environment.

And, of course, the magazine *looks* different. Very different. Under the direction of our new art director Rick Stark, not only is there more color and more attention being paid to the way stories are presented, but we are using a whole range of type styles, designed to make the magazine more readable than ever.

Why these changes? The answer is simply that no product exists that cannot be improved—whether it is a piece of electronic equipment or a magazine with a history going back almost 25 years. In this case it is clear that the very nature of technical and engineering management has changed, evolving into a level of sophistication unheard of in the past. And so the magazine for technical and engineering management is changing too—and will continue to grow along with its readership.

We look forward to hearing your response to to our new program, and thanks for your continued interest in *BME*. ■

Robert Rivlin
Editor-in-Chief

the SOURCE

Midwest Links Fox Network to the World

Why did management at KTTV, flagship station for the FOX broadcasting network in L.A., go to Midwest Communications for their new S-23?
Because Midwest is number one, worldwide, in mobile satellite communications design and integration. The results were outstanding!

"With our Midwest built mobile satellite communications truck, we no longer have any limitations to our coverage area. That is very important to a news station in the L.A. market. It is also important that Midwest brought the truck in on time and in budget."
Bob Morse,
VP/General Manager KTTV

Steve Blue, KTTV News Director, continues:
"The ***Spacelink*** gives *Fox News* an advantage our competition can't top... Midwest was prompt with delivery and prompt with support."

Make Midwest the Source for all your mobile satellite communications needs. For more information on the S-23, contact your Midwest representative today.

KTTV VP/Director of Broadcast Operations, Steven H. Steinberg, sums it all up with this comment:
"This is the second S-23 that I have purchased from Midwest. It is not often I can say this, but in both cases, there were no problems."

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Communications Corp.

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FEEDBACK

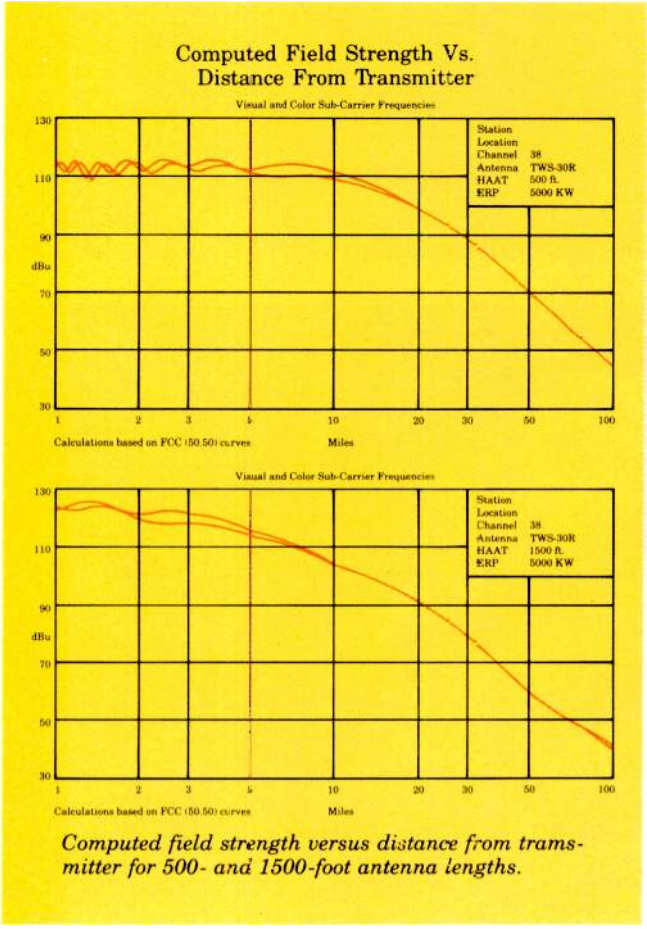
The Case for Bottom-Fed

A recent article in *BME* ("TV Signal Degradation," March, 1988, p.164) questioned the performance of bottom-fed waveguide slot antennas and their effect on signal quality. The issue was the variation of antenna pattern characteristics over a TV channel. This variation is inherent in all antennas used in practical TV antenna designs. By careful attention to design parameters and pattern adjustments to fit the application, the effect of beam steering and other pattern variations are reduced in order to have negligible effects on TV signal quality and allow a broadcaster to realize the benefits of increased reliability of a waveguide design.

A medium-gain Wavestar antenna may be used with high-power UHF transmitters to safely attain 5000 kW ERP on all UHF channels. Wavestar antennas commonly achieve 5 million watts ERP with a power gain of 28. This ERP is not feasible with an omnidirectional coaxial array.

The waveguide design eliminates the need for complicated feed harnesses inside the antenna with internal coax lines. Such lines are often operated at their limited power handling capabilities, are prone to failure, and require maintenance due to connector wear from thermal cycles. Some coaxial fed antennas of this type use unequal line lengths to the upper and lower antenna sections.

A typical center-fed coaxial UHF slot antenna runs the input coaxial line inside the tubular mast with the upper antenna section being fed from the bottom and the lower section being fed from the top. Beam steering thus occurs in the opposite directions for the two sections so the peak of beam angle does not change. The main beam increases in width with a change from the center frequency and reduces the power gain.



Computed field strength versus distance from transmitter for 500- and 1500-foot antenna lengths.

End-fed waveguide arrays require accurate and extensive measurements to assure proper performance in the field. Harris Broadcast has developed two state-of-the-art facilities to assure accurate measurements. Each Wavestar omni/trilobe array is thoroughly tested using both near- and far-field techniques.

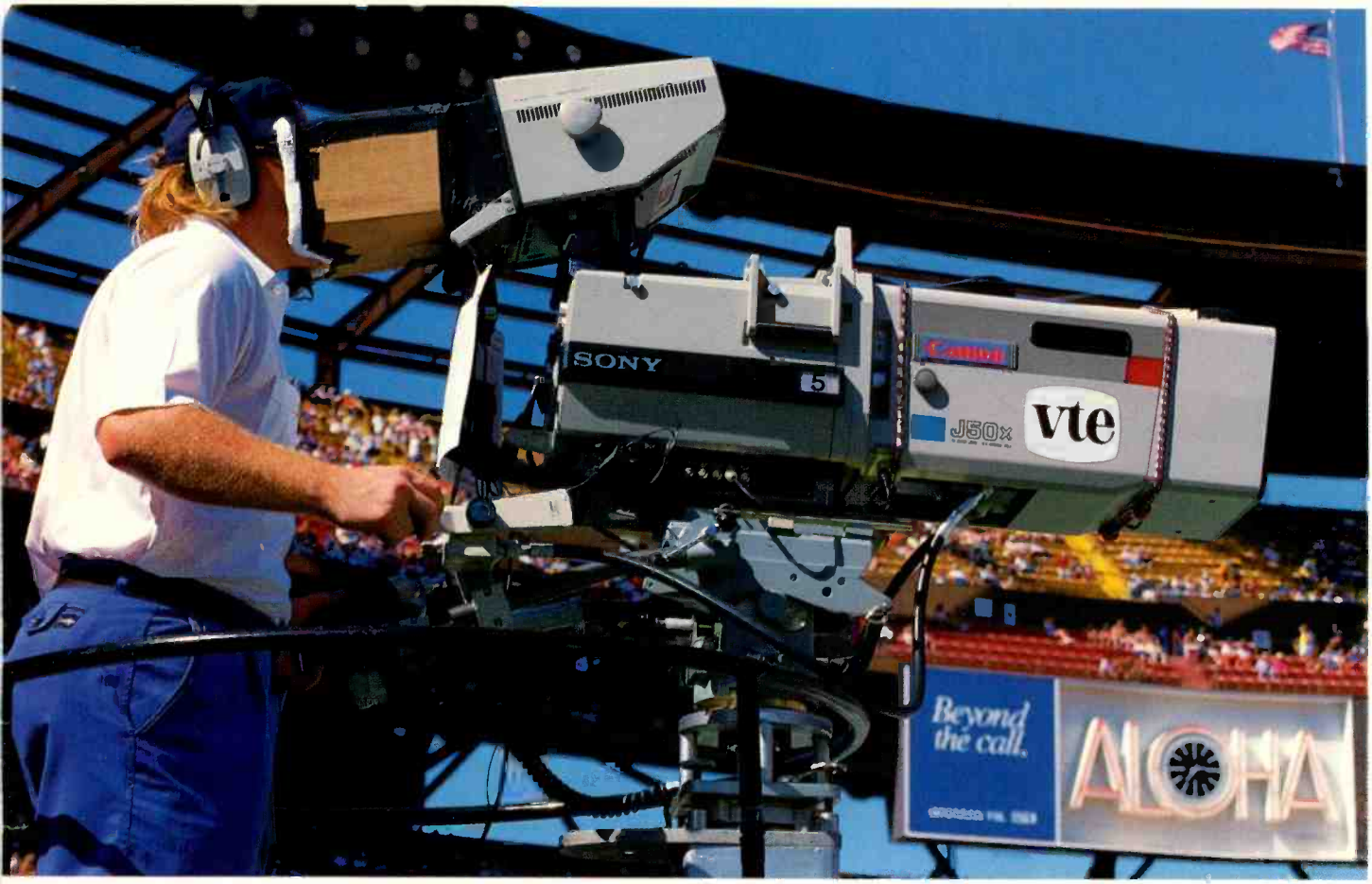
The elevation pattern of each antenna is carefully adjusted both on the Harris near-field test range and then on the three-mile far-field range to verify antenna performance and the effect of beam steering by calculation of signal-versus-distance functions across the channel from the pattern data.

Such calculations show the greatest changes occur for distance less than 15 miles from a 1500-foot tower where the close-in signal level is in the excess of 105 dBu. Towers of this height, or higher, are generally located away from heavily populated urban areas, so only a small percentage of viewers are in the under 15-mile range. Sound level, stereo, or SAP signals are not effected because of their bandwidth compared to the TV channel.

The benefits and reliability of the Harris Wavestar antenna greatly outweigh the negligible effects on close-in reception. Careful adjustment of the antenna under controlled conditions is the key to successful and accepted design.

R.R. Weirather, Dir.
Strategic Marketing
Harris Broadcast

Do you have any questions, comments, or criticisms concerning what you read in BME? *Any bulletins or issues you want to open up to other engineering management readers? Our letter column, Feedback: is your forum. Write to: Feedback—BME Magazine, 295 Madison Avenue, 19th Floor, New York, NY 10017.*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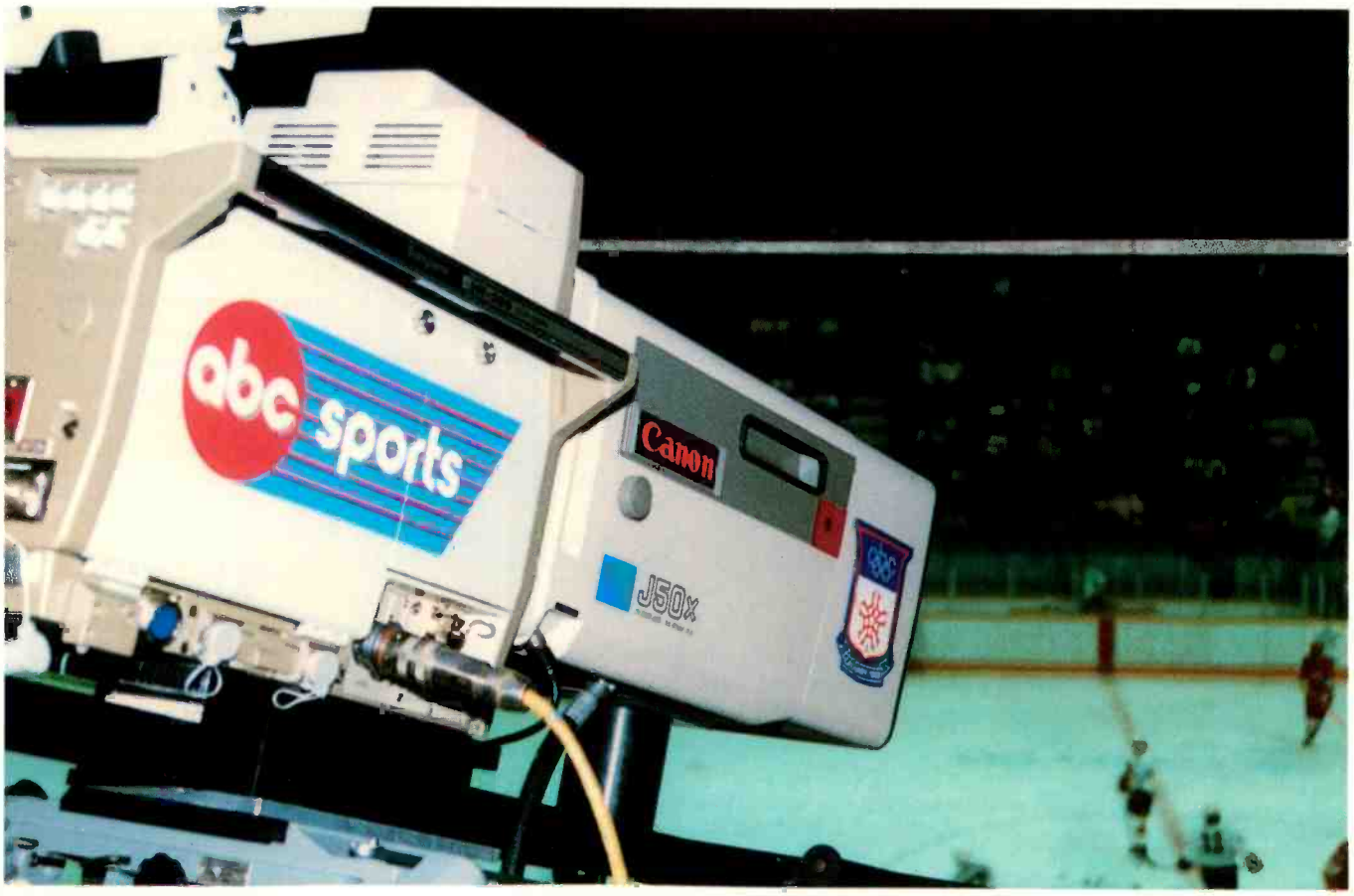
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Canon Answers the Needs of the Broadcast Industry Once Again.

Introducing the Canon J50X9.5BIE.

Canon answers the demanding requirements of electronic field production with the sensational new J50X9.5BIE. The perfect lens for outdoor events like the Super Bowl and the Calgary Olympics where the J50X was put into action. Featuring a 50X zoom ratio, f1.4 maximum aperture, and an effective focal length of 9.5 to 950mm, thanks to its built-in 1.5X and 2X extenders. Any way you look at it, the J50X9.5 gives you incredible reach. Yet, it's great indoors too, with a minimum object distance of 7.2 feet and macrofocusing to 20 inches. Plus the usual high M.T.F., minimized distortion and chromatic aberration you've come to expect from Canon broadcast lenses.

An optional rotary shutter provides a choice of 1/1,000th, 1/500th and 1/250th sec. high shutter speeds and will interface with most major manufacturer's cameras.

The J50X9.5BIE is designed for outstanding performance on both 2/3" tube and CCD cameras. And with a weight of just 36 lbs., these credentials are even more impressive. Simply stated, the J50X represents the most advanced design in optical technology available to the broadcast industry today. There is no better lens to meet the tough professional standards of electronic field production. So the next time you need a broadcast lens with the reach of a 50X zoom and unsurpassed optical quality, choose Canon. Because no other lens measures up.

Canon

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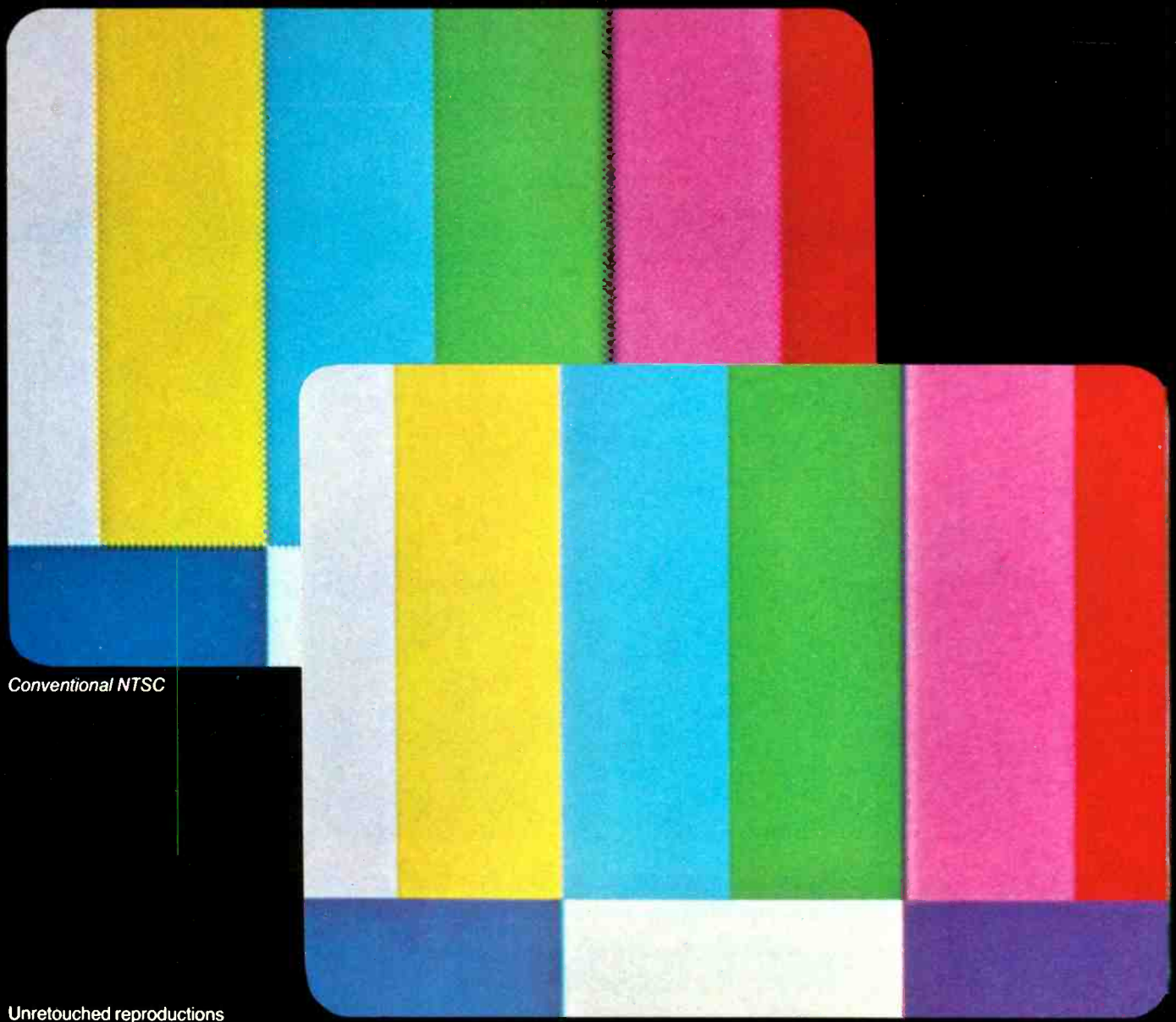

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UPDATE

Philips unveils HDTV efforts. . .NRSC proposes second standard. . .Democrats turn to fiber. . .Different definitions for television

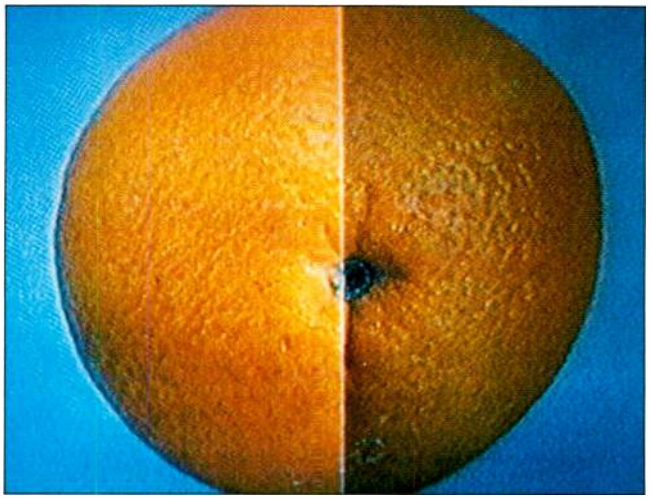
Philips Unveils HDTV Efforts

At its Briarcliff headquarters in mid-May, Philips Laboratories unveiled a new high definition television system that is NTSC compatible but uses a different scheme from the ACTV system developed at Sarnoff Research. The new Philips system, dubbed HDS-NA (High Definition System—North America), will take advantage of what the company terms "a gracefully evolving transition from current NTSC to true HDTV in the future."

Capable of being demonstrated at this point with actual video rather than computer simulations (still the case with ACTV), HDS-NA has a 1050-line vertical resolution, considerably expanded horizontal resolution, a 16:9 aspect ratio, and up to six "CD quality"audio channels. Currently, only the vertical resolution and aspect ratio improvements can be seen; but the horizontal resolution improvements will be added by the end of the year. This improvement will offer 400,000 pixel resolution as opposed to the 145,000 pixels used by NTSC.

Like several other proposed HDTV transmission systems, the HDS-NA signal will require greater than 6 MHz of bandwidth. The augmentation channel necessary to carry the digital audio and enhanced resolution video is only 3 MHz wide, however, offering the possibility that two standard TV channels could share a third for both their HDTV programming.

The augmentation channel, in order to avoid leakage problems inherent in close channel spacing, is a low-level digital signal. This also makes it appropriate for transmission on cable and ISDN telephone network distribution systems.



NTSC (left) and new technology from Philips displayed on consumer video monitor.

The augmentation channel in satellite feeds is called HDMAC-60 and is a multiplex analog component signal used as a master feeder and distribution signal. This signal processing scheme conveys higher resolution, wide aspect ratio, artifact-free pictures and the extra channels of digital-quality audio.

NRSC Proposes Second Standard

The NRSC has proposed a second voluntary national standard for AM radio transmission. The standard enables AM broadcasters to further control interference to their signals for better audience reception, and complements the first NRSC standard proposed in 1987.

Called the RF Mask, the new standard has a parallel in the development of a new technology to monitor AM splatter. The new monitor permits economical and accurate measurements of undesired AM interference and can be used in conjunction with the RF Mask specification.

While the first NRSC standard was intended to specify to audio signals present at the input to a station's AM transmitter, the second is for RF limi-

Hardtop or Convertible

Choose a CCD camera that's right for what you want because there's no reason to pay for more than you need.

The Hitachi FP-C1 3-chip auto set-up camera is a rugged workhorse when you need a stand-alone model with high resolution and high sensitivity that's easy to operate.

The FP-C2 dockable version gives you the added versatility of owning one camera for all formats. Our multi-standard, switchable encoder provides outputs for Beta, MII and S-VHS.
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tations. It characterizes RF emissions of AM stations that use the first standard and specifies the RF signals that leave a station's transmitter and antenna system. NRSC-2 consists of a limit on out-of-band AM emissions and accompanying measurement procedures. A copy of the RF Mask is available from the NRSC.

Democrats Turn To Fiber

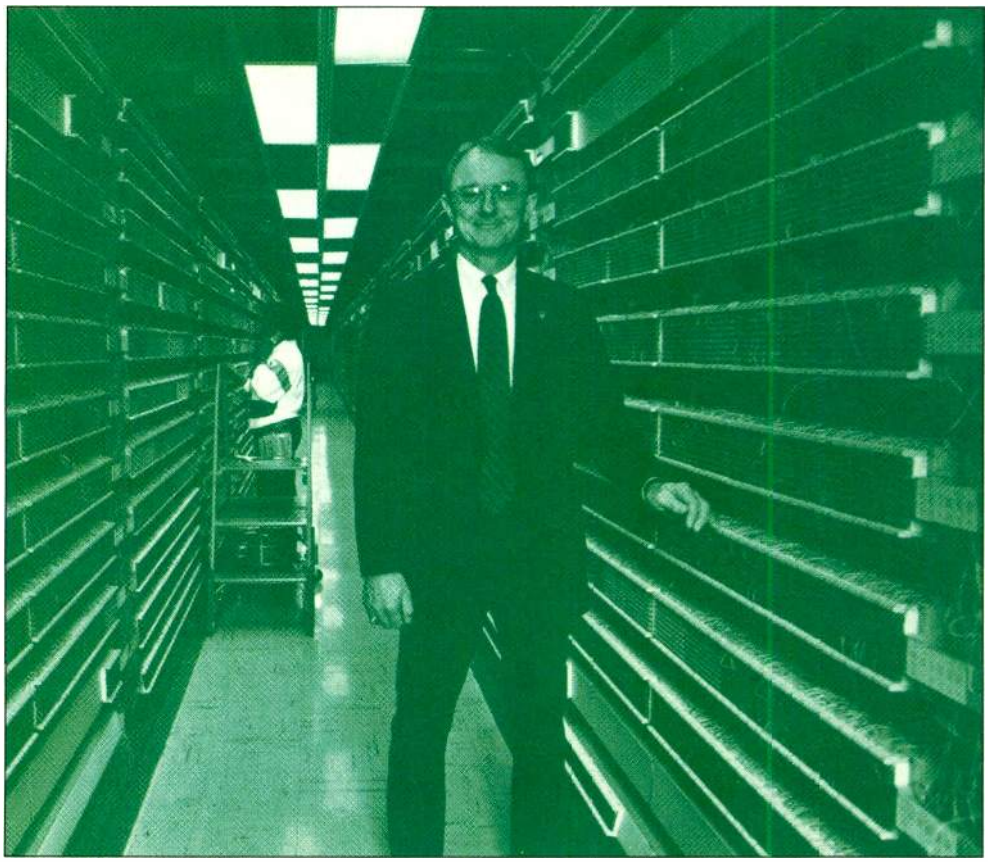
At the Democratic National Convention to be held in Atlanta July 18-21, visiting news crews will be relying heavily on fiber optic cable to relay video signals to the various news locations. To accommodate this, Southern Bell has been installing, statewide, more than 30,000 miles of fiber at a cost of $1.6 billion. Over 16,000 media people are expected to make use of the new fiber network.

The necessity for fiber in Atlanta is acute due to the availability of only seven microwave channels on the two GHz band. So, the new 1,063 mile citywide network of fiber will offer 130 video circuits for use from the Omni to the the numerous termination points, including SNV locations. And there are expected to be between 80 and 100 SNVs, more than four times the number employed at the 1984 conventions.

Specifically, the fiber will link the Omni arena where the convention itself will be held, and the adjacent Georgia World Congress Center, serving as the media work space, to dozens of transmission sites throughout Atlanta. Local affiliates with fiber termination include NBC affiliate WXIA, WSB, an ABC affiliate and CBS's WAGA.

Other broadcasters serving as termination points in the fiber web include WPBA (PBS), WATL (Fox), WGNX (Tribune), Crawford Communications and UpSouth.

Southern Bell's Paul Harman at the COSMIC center of the Metro ESSX fiber optic center.



Norman Lear

Lear Presents Excellence

Norman Lear, TV producer and chairman of *BME*'s parent company Act III Communications, was the keynote speaker at the first annual *BME* Excellence in Engineering awards ceremony held at NAB to recognize outstanding achievements at TV and radio stations and teleproduction facilities.

"Excellence isn't something you're born with—it's something you strive for," said Lear, who proclaimed that for years he had been waiting for the opportunity to publicly thank engineers and technicians for their role in the success of his TV shows.

Those sentiments were mirrored by Eric Disen, director of technical operations for CBS Radio, West Coast, who accepted the award for his efforts with KNX-AM. Disen commented that "it is all too rare for those working behind the scenes to receive the recognition they deserve." Another radio station, WDUV/WBRD, was honored for exercising unique vision in designing and renovating a station in order to compete in to-

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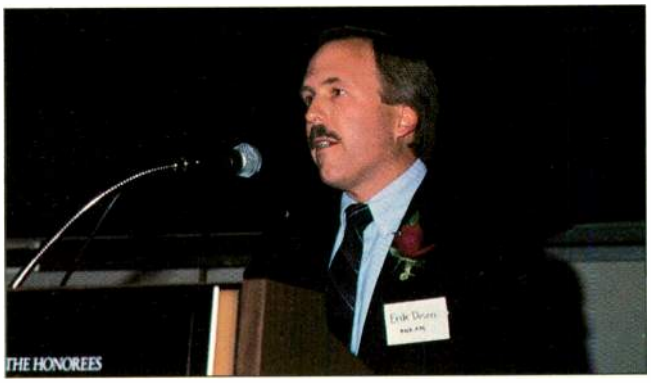
UPDATE

day's tough radio markets.

Perhaps the most impassioned acceptance speech came from Yves Faroudja, chosen for his contribution to the enhancement of the NTSC television standard. "I am not finished yet," he proclaimed, "and I will continue until I have gotten everything out of it that I can. We are 95 percent of the way there now and when we are finished, I will retire." Faroudja's remarks met with an enthusiastic applause from an audience all too familiar with the difficulties of living under the restraints of sometimes inadequate technical standards.

Yves Faroudja
Eric Disen, KNX-AM



Others recognized for achievement were Gene Wright for the CNN Center, Charlex for advanced design in a teleproduction facility, Ray Dolby for a lifetime of contributions, the NRSC for its efforts in AM radio, WQEX-TV in Pittsburgh for small station contributions, WSYT in Syracuse and the Sarnoff Research Center for, among many past accomplishments, its efforts in advanced definition television systems.

Transoceanic Fiber Connect

For those broadcasters who regularly field ENG crews overseas or who take overseas feeds directly from European news sources, a breakthrough is near. The first private transoceanic fiber optic cable system between the U.S. and Europe is nearing completion and is expected to be operating in early 1989.

Countries benefitting from the development will be the U.K., the Republic of Ireland, Bermuda and the U.S. The system itself consists of two high-capacity optical fiber cables linking the two continents, with domestic access through New York and Philadelphia.

PTAT Systems and Cable and Wireless of the U.K. jointly own the system, while Mercury Communications, a wholly-owned subsidiary of C&W is the licensed public telecommunications carrier.

Different Definitions For Television

Following last year's announcement of the development of Advanced Compatible Television (ACTV), the Sarnoff Research Center and NBC unveiled another system, ACTV II, at this year's NAB convention. Positioned by NBC as competition to what it terms the imminent DBS-delivered HDTV, ACTV II was billed an intermediate step toward higher definition.

Like HDTV itself, ACTV II requires greater amounts of spectrum than does conventional NTSC's 6 MHz, yet it is still compatible with the existing format. Providing 1,050 lines of resolution at 2:1 interlace, it was said to be close to HDTV in performance. The two principal companies related that they were convinced additional spectrum will become available, allowing ACTV II to compete with other forms.

Specifically, the new system uses a second channel to provide enhancement information to the originally transmitted ACTV signal. Even though the newer system will be compatible with NTSC, it will require a special receiver for the reception of the enhanced information channel. Representatives from Thomson-owned RCA consumer television set division were on hand to explain their committment.

Support for these developments came quickly in both the broadcast and the cable television segments of the industry. At the cable television convention held from April 30-May 3, HBO and major system operator ATC announced an agreement to provide funding for tests of ACTV and its abilities to stand up to the rigors of cable transmission. Also ABC's Julius Barnathan has given encouragement to development of ACTV II as well as other line-doubling enhancement schemes, including those being prepared by Yves Faroudja. ■

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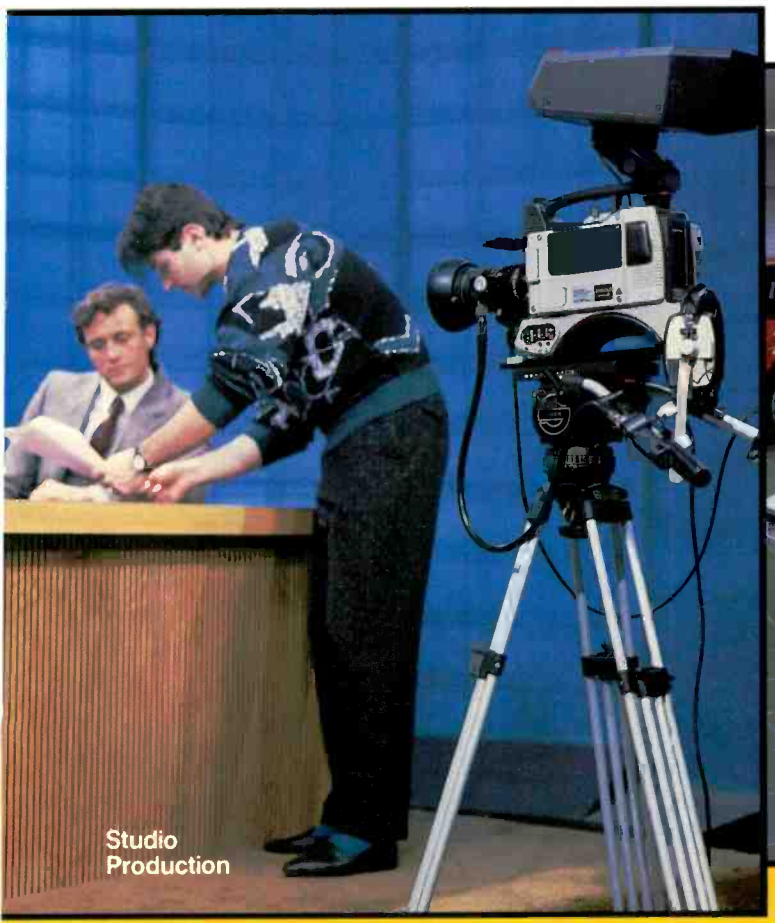
For editing and post-production applications, the Pro Series takes full advantage of the SVHS format as well. With easy to use features and high performance capabilities. Such as digital framing servo circuitry to provide highly stable edits. And time code input/output facilities for frame accurate editing. The Pro Series editing VCR also features 7-pin dub capability to maintain component signal integrity throughout the system.

For studio production, Pro Series components are designed with flexible operations in mind. With VCRs and monitors outfitted for total systems application. And cameras designed for use both in the field and in the studio. To help minimize your investment without limiting your capabilities.

For duplication, Pro Series monitors and VCRs provide you with the convenience and versatility of half-inch cassettes. And the performance of SVHS. When duplicating, you can maintain excellent picture quality thru component or composite signal transfer. And dub Hi-Fi audio simultaneously with the video signal. There's even a Pro Series cassette changer to help increase the efficiency of your duplicating system.

even as you sharpen your pencil.



Whether it be a small or large operation.

For video network applications, the Pro Series produces high quality images on both large projection systems and small screen monitors. With features like auto repeat playback for unsupervised presentations. And the system is upwardly compatible with standard VHS. So you can continue to use your existing library of recordings without any type of conversion.

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CROSSTALK
AN ENGINEERING MANAGEMENT JOURNAL

High Flying News Bureau ... Harry Taxin Resigns ... Low-Power Net Forms

High-Flying News Bureau

Veteran CNN special assignment reporter Chuck de Caro may shake up the accepted system for network newsgathering.

At the outset, the firm hopes to make two fully-appointed planes available for location reporting. A four-engine Lockheed L-188C Electra turboprop aircraft has been outfitted with broadcast newsgathering equipment to offer on-location event coverage at a substantial savings over conventional methods. Ready for flight this fall, *The Amazin' Lady* is a complete flying newsroom with Ku-band uplink for live broadcasts. She can actually uplink, through triple-redundant communications, while in the air.

The Amazin' Lady can get to a story 4200 miles away at the speed of 405 mph. Since it has living and dining facilities, and provides its own power, it can operate autonomously for up to a week.

To assist the venture, de Caro has enlisted the aid of several former top executives at CNN, including Ted Kavanau, former vice president of Headline News and Special Assignments. Other consultants included Hodding Carter, PBS commentator and former Assistant Secretary of State.

De Caro has also collected a full crew of air support. His main backer, the International Air Services Company (IASCO), has provided the aircraft and air operations knowhow.

Chuck de Caro, head of Aerobureau Corp., with its aircraft.

OPEX is providing operations support, and Avionics Engineering Services integrated the avionics, broadcast electronics, and sensors. John Gosswick of Avionics Engineering Services, a boutique avionics shop for government shoppers, will design one-of-a-kind systems for the plane. A yet-to-be-disclosed firm will provide an electromechanically steered antenna for the final all-up aircraft. F.G. Bercha and Associates is adding the dimension of remote sensing, adapting from existing surveillance and security systems; this is where the Side-Looking Airborne Radar (SLAR) will come from.

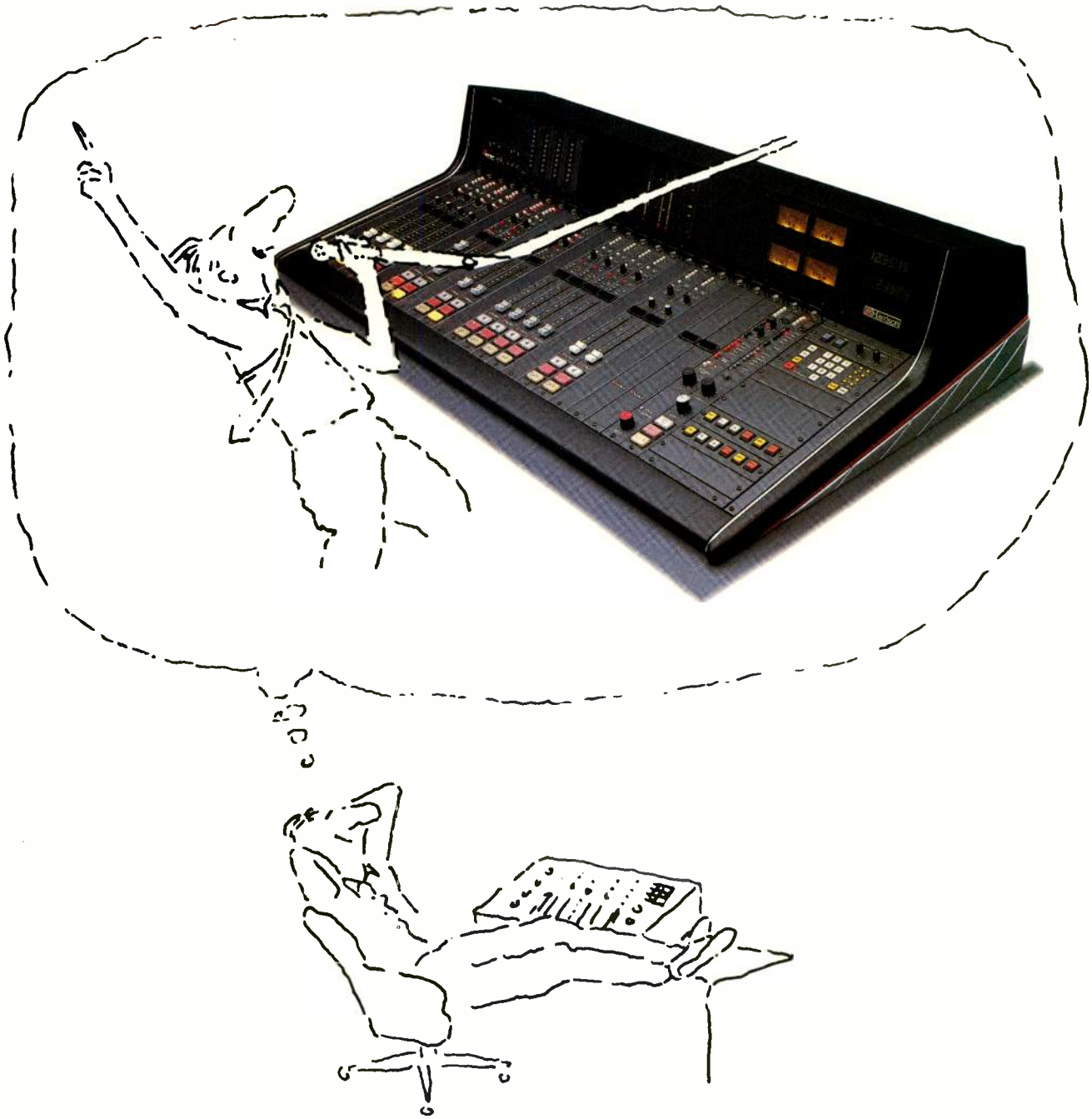
Each crew member will have a particular area of expertise but will be able to perform a host of different functions. They will be journalists from different areas, who, under the right leadership and organization, will do the work of three times their number. Each, for starters, will be a licensed pilot. Each will be able to report in front of the camera as well operate the camera and edit video. Fluency in at least one other language is also mandatory. "By accident," says de Caro "we have no women in the crew yet, but I'm looking for one." Applicants for this rough-and-ready job should apply directly.

A variety of cameras and other kinds of equipment will be used by the service. De Caro prefers to lease rather than invest in any one format. He even believes in using home or industrial equipment in certain situations. "I'm a firm believer in cheating," he says.

There will be three edit suites on the airplane, one of them dedicated to format integration so that they can go from PAL to NTSC easily. He plans to "overwire" the setup.

The 132-foot long plane will house a helicopter, dune buggies, engineering and storage, the edit booths, a small studio set with chromakey, a director's booth with robotic camera, the RPV (a dispensable robotic air vehicle that can be sent into dangerous areas) and sensors, and of course the quarters and head.

The Amazin' Lady will employ a variety of antennas. The SLAR, (Side-Looking Air-borne Radar) mounted on the bottom, can discern terrain,



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vegetation, cars moving on highways—day or night—up to 75 miles away. FLIR (forward-looking infrared) and SLOS (stabilized low-light optronic system) fill out modalities. Although the main method of transmission will be Ku-band, the plane will also have a flat six-foot-by-four-foot C-band for on-the-ground areas where Ku-band won't work. The Ku-band will be the only system capable of transmission in the air, though.

The first operation will take place at the end of July when de Caro plans to set a world speed record going from Tuscon to Oshkosh, WI, for the Oshkosh Air Show.

The upshot of this new availability is the "scoop factor." CBS has shown a good deal of interest before the plane has even gotten off the ground, de Caro reveals. It offers angles that would be very difficult before. It also makes broadcasting from countries that will not allow transmission possible by broadcasting from international airspace. Aerobureau believes that it can provide 60 percent savings in network costs and 60 percent in reaction time.

Harry Taxin Resigns

Replacing Harry Taxin as acting president and CEO of Cubicomp is Donald F. Bogue former vice president and general manager of Ampex's Audio Video Systems Division.

Bogue's history as a director of Cubicomp, a post he held for a year and a half, gives him a good familiarity with Cubicomp's product line. Ampex is very active in its distribution of the PictureMaker and remains a very interested investor.

One of the main reasons Bogue was brought in, and the issue that he and the board will address first, is growth. A good deal of what he'il begin working on is marketing. As Bogue says, "I think the most important issue for the company is to make sure that we are properly identifying as many prospects for a product as possible."

While it's impossible to be completely forthcoming on new products, Bogue hints, "Systems are becoming at the same time more capable and more user-friendly. And in that combination, the market is naturally going to provide people who have stayed away from 3D or have stayed away from animation."

He indicates that the staff is not short on talent or concepts, and the company is not short on investors to back the former two. Bogue says, "We've combined the people that developed the Vertigo product line with the people that developed the PictureMaker."

Products like this year's time-shortening RACE add-in render accelerator board will probably be part of the focus in this area. "This is the sort of thing that our customers, or our prospective customers, can relate to because it's such a bottom-line effect," he comments. "The whole question of productivity in a video production environment is something to deal with. Everyone would like the ability to create effects, but certainly in the broader market, they need to be able to cost justify these things."

Cubicomp has other business plans that are expected to become apparant within the next two or three months. After that point, the board will conduct a search for a president and CEO. Bogue is included in the running and there is a possibility that he will stay on in a permanent capacity after this formal search is complete. ■

Low-Power Net Forms

Is it possible that a technique established by the FCC in 1956 to allow full-power stations to expand their reach is the newest broadcast medium?

Low-power television (LPTV) got a boost in 1980 when legislation was passed that allowed TV translators to originate programming. Originally, the stations served merely as transferring and amplifying points. The service was hindered by bureaucratic and programming problems at first, but has since picked up steam. As of this writing, 310 low-power stations are actively broadcasting (excluding the 249-station Rural Alaska Television Network) and 400 construction permits are active. LPTV is said to provide screen image quality equal to that of full-power television, but is limited to a 15-25 mile transmission radius, as opposed to the 50-70 mile radius of "standard" television.

All of this represents a lot of opportunity for some investors. One of the largest companies currently involved in the field is Channel America. This month, the company will become the first LPTV network offering original programming. Chairman and CEO David Post has outlined a multi-phased plan that will have many more stations offering a full schedule by next year. At this point in time, Channel America has been able to acquire 23 stations (estimated reach: 10 million viewers) in only one year due to the lack of FCC limits.

With its 23 O&Os and 30 affiliates, the company will begin broadcasting three hours of locally-oriented programming per day. As most of this will consist of interactive shows, with telephone hook-ups and other data exchange mechanisms for viewers to communicate with the stations, the network has presented significant engineering challenges.

It remains to be seen whether Post's plans and his network will come to fruition, but with 400 construction permits granted recently as a result of the first filing window since a freeze imposed in 1983, the possibility seems to be real.

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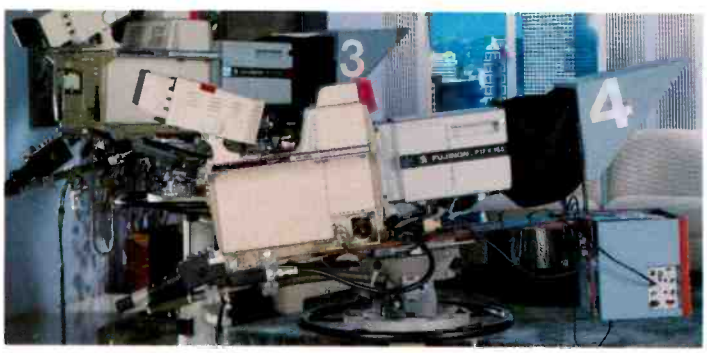
All major components, including power supply and pattern projector, are modular. Motherboard construction and no wiring harnesses simplify trouble shooting to make field servicing a practical reality. Without removing the shroud, there's easy access to the tally light switch, back focus adjustment/lock, circuit breakers, and pattern projector color levels and chart positioning.



Production guesswork is gone. Focal length and aperture are reported through viewports in the lens shrouds or via LED indicators. (Combine this with Fujinon's microprocessor-controlled shot boxes for unerring production control.) Zoom speed control is smoother and ramping can be avoided completely by limiting the zoom range to match lighting levels. You can also see if an extender is deployed and which one. And deploy extenders from a remote demand unit, shot box or manually from the lens itself.

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"Desktop Manufacturing" Creates Realistic 3D Models

By Beth Jacques

CAD programs have made rapid strides over the years, allowing engineers and designers to visualize two- and three-dimensional objects on the computer screen or as hardcopy prints and plots. But if you have ever wished you could generate actual physical scale models from a similar database, you may soon have the opportunity. A graduate student at the University of Texas has invented a device that builds three-dimensional models of objects immediately after they have been designed by a computer.

Called "selective laser sintering," the process—which is currently undergoing commercial development—is more likely to become known generically as "desktop manufacturing." According to Carl R. Deckard, a graduate student at the University of Texas who invented the process, the system is like a three-dimensional laser printer that produces a solid object.

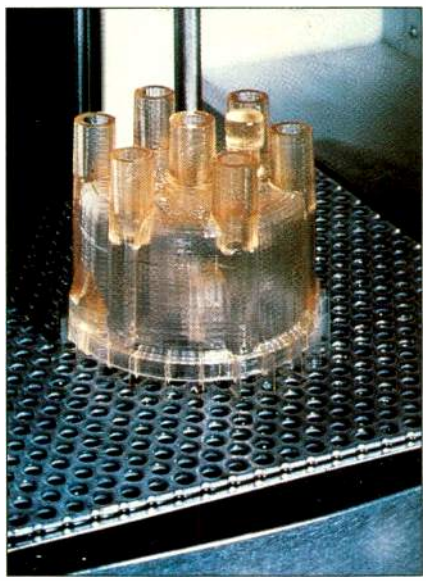
Parts are heated to drain off excess liquid and complete the polymer cure, support structure is cut away, and the part is painted or surface-finished.

Once it becomes available commercially, the laser sintering process will enable three-dimensional solid objects to be produced directly from a computer database.

To date, Deckard and Dr. Joe Beaman, his faculty adviser, have created small-scale plastic models made of shiny hardened carbon powder. Each model took about 13 minutes to form and each is about the size of a cigarette packet. They are intricately designed: a box-within-a-box and stairstep shapes with intersecting walls.

Once the shape is made, a technique called lost-wax casting is employed to create a full-strength mold for modelling.

The laser sintering technique can also achieve specified part geometry in one operation, as opposed to current procedures which require many manipulations. The system is compatible with most CAD systems via a software interface and can provide three-dimensional copying or facsimile transmission.



Cured by a laser beam in a vat of liquid photopolymer, the design emerges as a solid three-dimensional real part—without tooling.

The laser sintering system's first commercial task is expected to be cutting the cost and design time of making prototype parts for many industrial applications. In the automobile industry, for instance, prototype production can currently take weeks or months.

Manufacturing industries, especially those which must make prototype parts rapidly before large-scale production, can be expected to find rapid three-dimensional modelling invaluable. Architects are also expected to find the process important for rapid construction of scale models of buildings.

Other applications are expected to be developed due to the technology's

Jacques is senior editor of BME magazine.

While Ed Murrow invented broadcast journalism to report a world war, Harris supplied the radio equipment that carried the word.

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ability to generate secondary-stage prototypes or molds. Typically, these are created by lost-wax casting or impregnation of the porous laser-sintered solid with other materials.

In broadcasting, desktop manufacturing can aid architects in studio or facility design. Architectural design programs could also be applied to set design for commercial or broadcast production.

The process can also be applied to new product design and prototyping in the professional broadcast equipment area. The incorporation of new features in an audio console can be previsualized, for instance, or the weight and balance of new equipment designs could be refined prior to prototype production. The process can also make the design and production of custom equipment quicker and less costly.

Perhaps the most tantalizing application for the broadcast production industry lies with model making for special effects, props and storyboarding. "If this process is as inexpensive, fast and high-quality as claimed, every special effects house in Hollywood will want one," insisted one New York commercial production director. If lifelike, full-size quality can't be achieved within time and budget parameters, the process can still be useful to help video production clients—or station, network or studio executives—visualize an effect or logo or new piece of design.

One of the stated aims of a similar 3D modelling technique is, in fact, to function as a three-dimensional plotter for the scientific community, illustrating relationships and data and making maps, diagrams and other 3D technical representations.

Technically, the term "sintering" refers to any process by which particulates are caused to adhere into a solid mass by means of externally applied energy. In this case, "selective laser sintering" uses optical energy supplied by a laser beam. The University of Texas process works as follows:

Designers use a CAD program to create a three dimensional shape and store the coordinates in the computer's memory. When the design is finished, the computer is commanded to fabricate the shape.

3D Systems' StereoLithography is a patented new technology that forms designs or parts from CAD/CAM/CAE-generated solid or surface model data.

Granulated plastic or a similar substance is poured into a box the size of a small television. A small roller, like a miniature street-paving machine, travels back and forth across the plastic, keeping it smooth and allowing even layers to build up.

The computer-controlled laser beam hits the plastic powder "selectively", heating only certain areas, which then melt into a solid shape.–When the laser has completed each pass, a new layer of powder is applied over the first. As the laser passes, it then sinters each succeeding layer to the previous one.

When the laser has finished, the object is "lifted out, dusted off, and ready to go," according to Dr. Beaman.

The Texas team claim the laser sintering process is fast: a competitive 3D process would take up to three hours to create the objects which took them up to 10 minutes. Deckard and Beaman's cigarette-pack-size models take about 13 minutes to make. There is no limit to the size of a model that can be made using the basic technology, according to Dr. Beaman. A more powerful laser would be needed to produce a larger model in the same amount of time.

While the University of Texas laser sintering device is under commercial development with Nova Automation of Austin and is some months away from market, a similar modeling device developed by 3D Systems Inc. of San Fernando, CA, was scheduled for delivery last month.

Called "stereo lithography apparatus" (or SLA), 3D's device uses a low-intensity ultraviolet laser to harden a liquid photoinitiated polymer, the same class of plastic which is used in making no-wax floor tiles. The $175,000 SLA is currently under test at General Motors, Kodak, Pratt & Whitney, and Baxter Travenol.

Stereo lithography works by using a laser to draw the bottom cross-section of a prototype across the surface of liquid plastic. The cross-section is then lowered a fraction into the liquid and the laser draws the next cross-section on top. After thousands of repetitions, the device will have reproduced a solid copy.

Like selective laser sintering, stereo lithography directly addressses the problems of time and expense of model building.

Because stereo lithography technology depends on surfaced or solid model data to generate its cross sectional patterns, there is a natural data link to CAD/CAM/CAE systems.

Stereo lithography equipment runs directly from a solid model CAD system, which saves time, because as soon as a solid model design is done, it can be made.

Technically, this works via a stereo lithography interface format, which passes CAD/CAM/CAE data to the operating equipment using a very rapid slicing algorithm.

In addition, the stereo lithography technology offers an interesting potential new application. According to 3D, the device can easily be adapted for hybrid technology use, because photocurable polymers adhere well to other substrates.■

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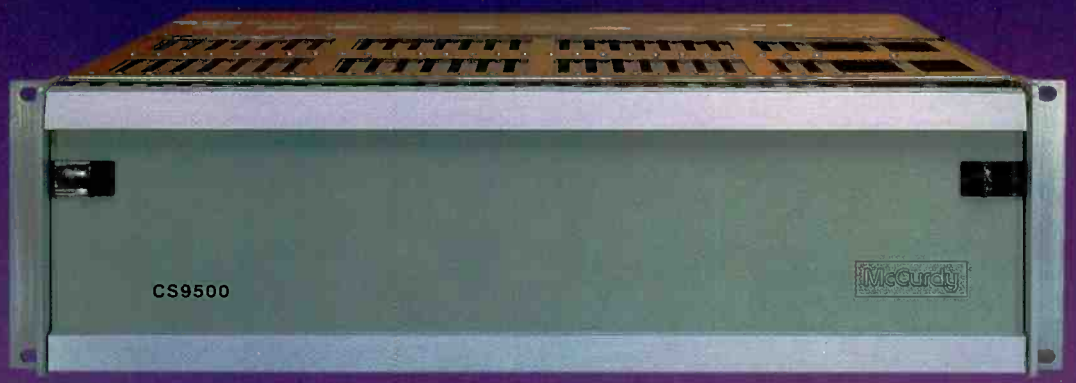

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THE INDUSTRY CONTEMPLATES ITS FUTURE

At NAB 1988, BME organized a trendsetting series of focus groups designed to explore the current and future state of the industry. Representing technical and engineering management at radio and TV stations and teleproduction facilities alike, the participants spoke candidly and openly about their engineering needs, and about manufacturers and their equipment on the exhibit floor.

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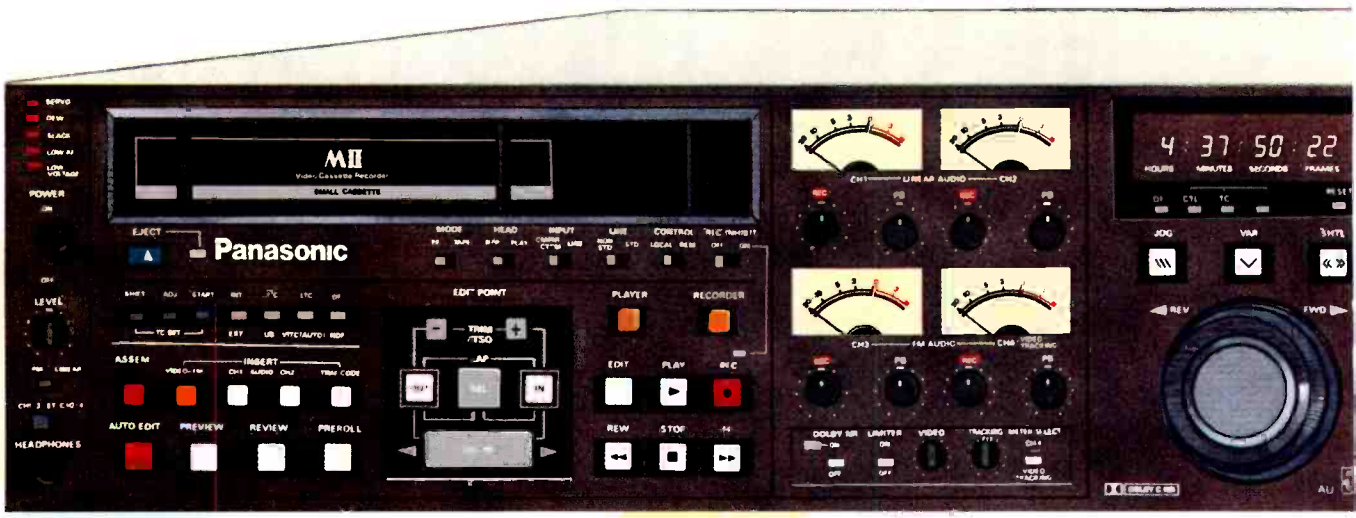

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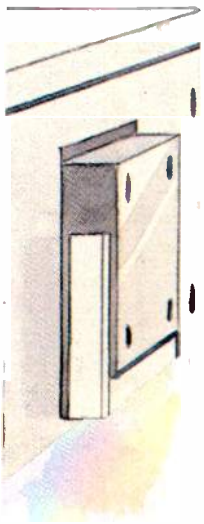

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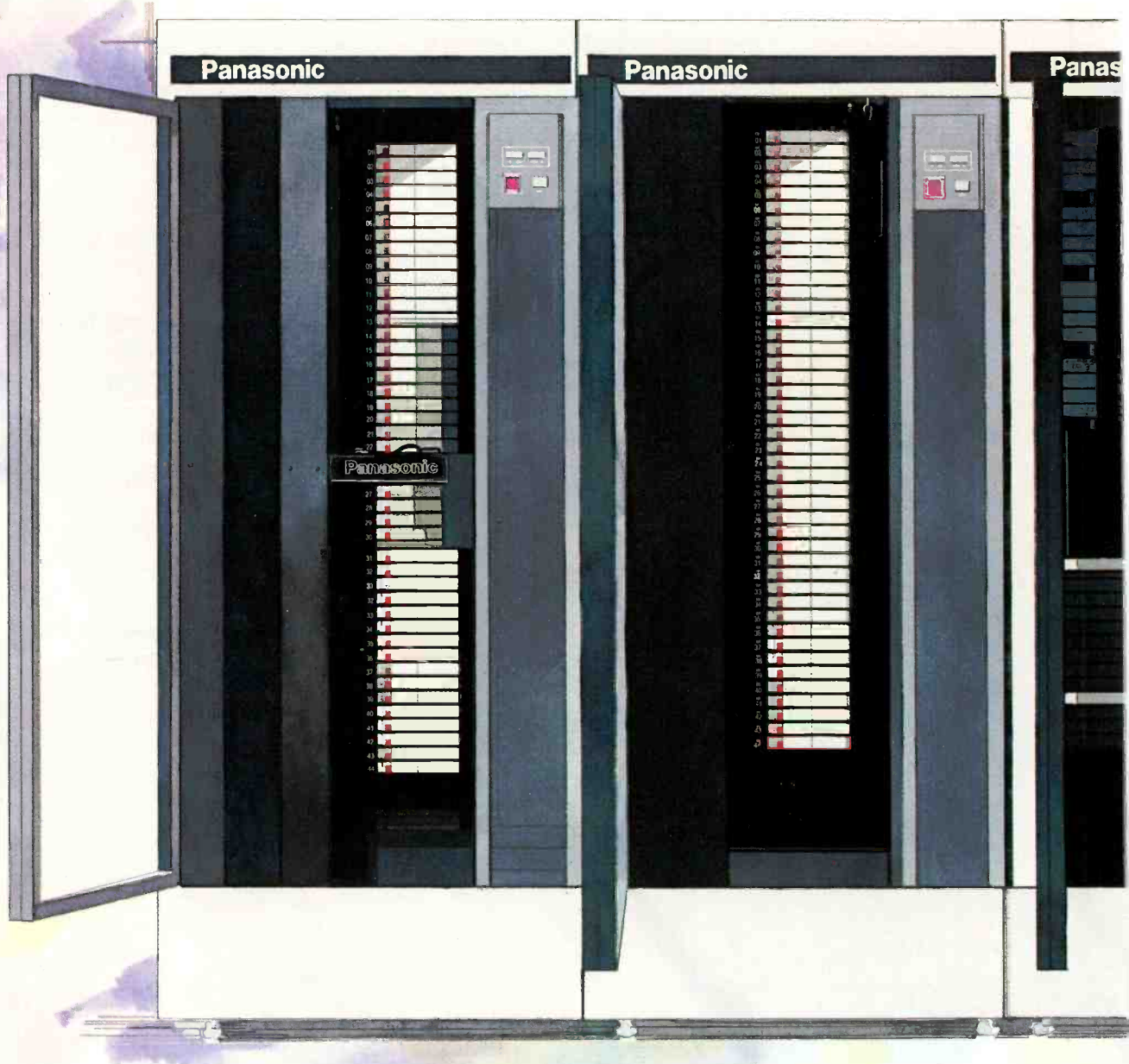

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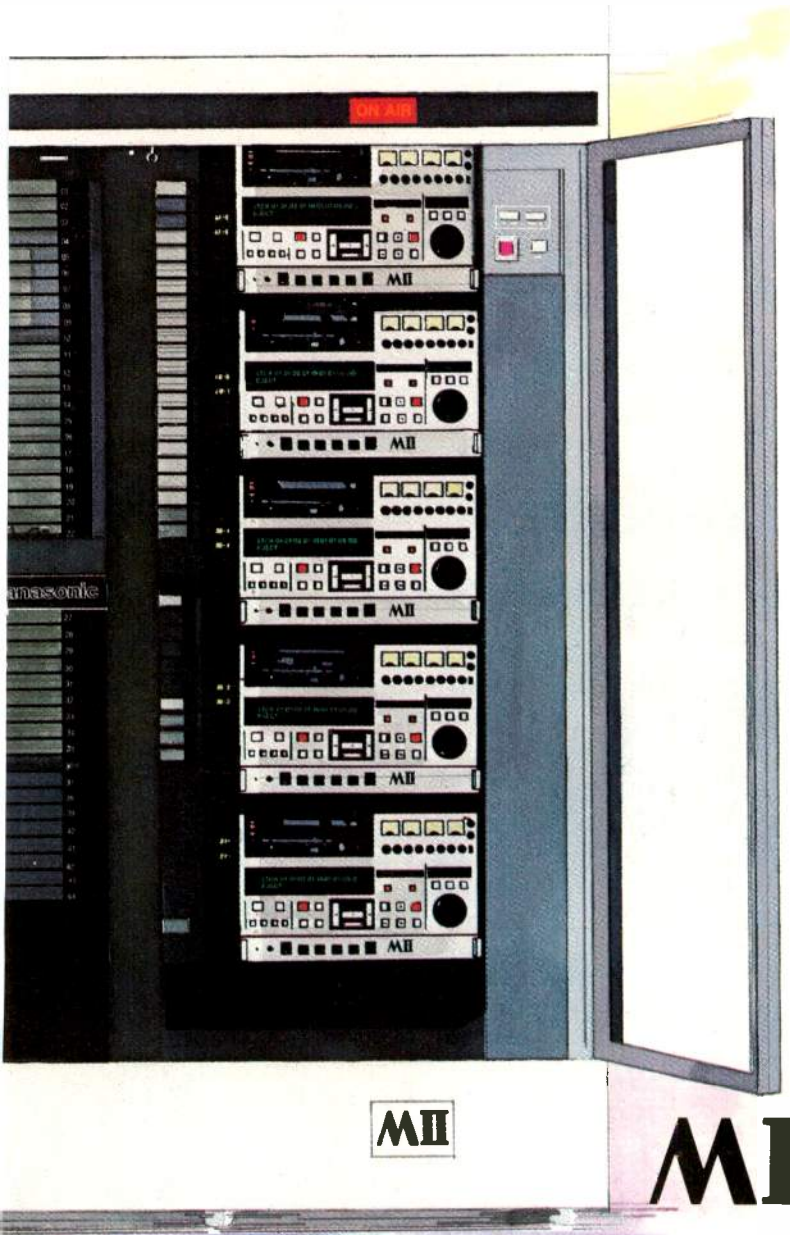

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HDTV: Expanding Television's Boundaries

With cable breathing down the neck of broadcasting, HDTV was one of the hottest topics at NAB '88, on and off the exhibit floor. Our panelists agreed that over-the-air broadcasters will suffer without the quick adoption of advanced television. They were also concerned about bandwidth limitations and the continuing dearth of studio equipment.

Panel members all had a practical interest in some aspect of HDTV. Merrill Weiss is managing director of advanced television systems for the NBC television network; Frank Hardman is director of engineering for American Family Broadcasting, which has joined with the MST and NAB to promote high-definition television; and Bob Ogren, Jr., is director of engineering for Freedom Newspapers Broadcast Division, which has invested in the compatible HDTV system proposed by Dr. William Glenn of the New York Institute of Technology. Robert Rivlin, *BME's* editor-in- chief, moderated the high-definition television discussion.

"Display technology is really going to drive everything."

—WEISS

BME: Do you think that whatever is being done in broadcasting is coming in time, given what is happening in cable?

OGREN: It can't happen fast enough right now. HBO is ready with a lot of software. And here we are with this limited spectrum space.

BME: Is there as much concern from a network perspective?

WEISS: Absolutely. For one thing, each of the networks is a major group owner. And if you look at the economics of the networks, their most consistent revenue producers are the owned and operated stations. Also, the networks are built upon a very strong relationship with affiliates, and so the local broadcaster has to be able to stay vital.

HARDMAN: We feel that HDTV is something that will get us in the news, something that TV broadcasting needs right now. Leroy Paul, the chief operating officer of our company's Television Group, went with me up to Sarnoff Lab and we were very impressed.

Tough decisions remain on how to implement expanded television.

BME: Do you feel that a system such as Sarnoff's ACTV-1, the basic six MHz system, would make

enough of a difference? Or do we need extra spectrum?

OGREN: We didn't feel that the Sarnoff system was enough, and that's why we decided to invest in Dr. Glenn's system. At this point in time, from what we've seen, it's not possible to get the necessary quality in 6 MHz bandwidth. We wish it was, because the extra spectrum does complicate things.

WEISS: Bob, you sound almost apologetic that you've put money into Bill Glenn's system. I, for one, am happy you're doing that because NBC as a broadcaster really only went into this because it saw nobody meeting its needs—kind of the same approach that you took. We really don't want to be inventors. We want somebody to develop a system that meets certain requirements for broadcasters. If somebody comes along with a system that's better than what Sarnoff has developed to this point, that's fine. We'll support that.

BME: Frank, has your group invested money in any research?

HARDMAN: We've agreed to, yes. We've joined with the MST-NAB. We feel like we need to do something, and this is the first step. We'd like the option of going on to wider bandwidths if the spectrum is available in the future.

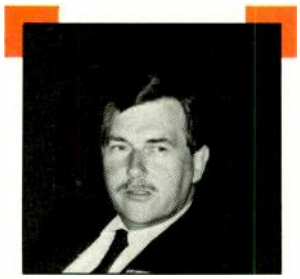
BME: What's the likelihood of that happening? Anyone have any hunches?

OGREN: I think that's very difficult to answer, but from what I read and hear of Alex Felker, the chief of the Mass Media Bureau, he seems to be attuned to making the American broadcaster competitive. So, we're hopeful. If we can do it in 6 MHz, that would be great. But we really feel we have to have equal picture quality so that we're not at a disadvantage. I think it is good that the private sector is helping out in developing alternatives.

HARDMAN: I think MST is doing a good job in management; they are alerted to the problem.

OGREN: Well, I think we've all seen what has happened to AM radio. Everyone I've talked to keeps referring to the "AM- ization" of television. That has obviously been a disaster for them, and we don't want to see it happen to us.

WEISS: One of the difficulties in trying to decide what to support right now is that the systems are improving dramatically. A few months ago, ACTV had defects that were not acceptable. Since then, it's become ACTV-2, and now the motion rendition is spectacular. Trying to keep up with it all and then pick a point where you say okay, as an industry we know enough to make a decision, is a really tough problem.



"We've got to avoid the 'AM- ization' of television."

—OGREN

OGREN: Can I ask you a question then? If there is increased spectrum space, how much additional spectrum are you planning for the new system?

WEISS: An additional 6 MHz—ACTV-2 assumes an additional channel. That doesn't mean that there can't be an intermediate stage. One of the assignments that we're giving to Sarnoff is to look at exactly that possibility, given the kinds of engineering tradeoffs that can be made. I would say what we're showing over there [Sarnoff's suite in the Riviera Hotel] is what we think is the best that can be done. We have no qualms about putting it up against studio high definition television.

BME: What does the final picture have to look like? How much resolution does it really need?

HARDMAN: From a PR standpoint, it has to be close to 1125 or 1050 lines.

OGREN: Even if you couldn't see the difference on the screen, I think the public will probably compare the numbers.

WEISS: 1000 has always been considered the magic number.

OGREN: I think one of the things that is going to help us out in high definition is going to be projection television and large screens.

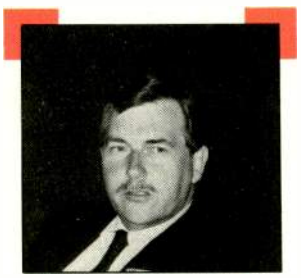
WEISS: Certainly that's the technology that is really going to drive everything. Viewers have been buying gorgeous projection displays, but they're not very satisfying with 525 lines. When people really start buying big displays, they are not going to be satisfied. That's when you'll start seeing the demand for higher definition pictures, and that's when we've got to be in a position to be able to deliver, because if we can't, they'll go elsewhere.

HARDMAN: I agree with you. I think that getting more spectrum is going to take some time. We don't know what problems we're going to get into with VHF main channel or UHF augmentation channel. The aspect ratio is going to be a big thing, because that's something that shows even when the TV set is turned off. I hate to say this as an engineer, but I think it's going to be a PR thing who gets there first and how strong they get there. If broadcasters introduce an HDTV signal, whatever it is, first, and sets start being produced, then that's the way it will go. If we don't, then we'll go another and incompatible way, perhaps.

WEISS: To pick up on that point, we've had discussions with set manufacturers, and they all tell us, "You broadcasters tell us what you want us

to build and we'll build it. But if you don't tell us what to build, then we're going to build it for whomever requests that we build something."

HARDMAN: Are we going to be able to come up with a standard? Is it possible for a group of broadcasters to agree among themselves to compromise on a system?



"Even if you couldn't see the difference on the screen, I think the public will probably compare the numbers."

——OGREN

BME: With all the competing systems, how do you decide which one to support?

OGREN: I think that basically, we need investment in a lot of things because we're not certain what is going to be best. We felt that we had to make a decision and we're glad that there are people investing in different things because we're all going to benefit in the end.

WEISS: If people are going to get involved, they really ought to do it soon.

HARDMAN: I agree.

WEISS: We need to get people like Del Ray into full computer simulation as quickly as possible to see if there is really promise there and if there is, then get people to fund the building of hardware; I would say the same thing about Glenn. If hardware is developed and needed, let's get it going, because the sooner we get all of the systems to the point of being in hardware, the sooner we can start getting some real answers as to what the best choice is.

OGREN: The one thing that I have heard from almost everyone is the necessity for compatibility; that's almost universal.

WEISS: People have to understand the various uses of the word "compatibility."

HARDMAN: That question was raised yesterday at the MST meeting.

BME: What is compatibility—what should it mean?

HARDMAN: Somebody raised a point: Is it truly compatible if you've got certain areas that are masked on NTSC signals that show up on HDTV? I can accept that as compatible, but somebody else may not.

OGREN: Compatible, to me, means that when we're broadcasting HDTV, viewers can still continue to watch us on their present sets and not notice any degradation.

HARDMAN: But, if they lose a little bit it's still compatible. Like if certain areas are masked off.

OGREN: As long as they can use that television set.

HARDMAN: If we're talking about any sort of two-channel system, the first question is, are there enough channels for everybody? There is no guarantee that a broadcaster today would get that additional channel. You might have to go into a hearing. It's a throw-back to when FM first came in. There were not enough FM channels for everybody to start with in every town. Some people lost out.

OGREN: I would assume that we're talking about a new allocation scheme in each market for additional spectrum.

WEISS: One of the ways it's been proposed to achieve additional spectrum is to eliminate the taboos in the UHF band, and that has a lot of promise. One of the reasons that we think that ACTV-2 would take a while to implement, even if you took that approach, is that you would have to take account of the fact that there are receivers out there that weren't designed to meet the new criteria. Receivers right now do what they have to do, given the taboos. You would have to wait for that population of receivers to die out, at least to some percentage level, before you could turn on the new stations that violate the old taboo. Until that happens, it may also be that you can be creative in the design of the signal that goes into that second channel to minimize the interference. All the taboos are based on NTSC signal to NTSC signal interference. Those are the kinds of things that people haven't really started to think about yet.

BME: Is there any interest at all at this point at the local station level in moving into high definition production?

OGREN: I'm involved now in putting in a post-production suite in our Providence facility, it definitely is a concern. We're wondering whether we're putting in a large investment right now that may be obsolete in a few years. But we have to be concerned about what is happening today.

WEISS: We've had discussions internally and are starting to have some externally with people to see what we can do to make production possible, using existing equipment. There is a fair bit of overhead in a lot of the gear that we have that could be better utilized.

"There is no guarantee that a broadcaster today would get that additional channel."

——HARDMAN

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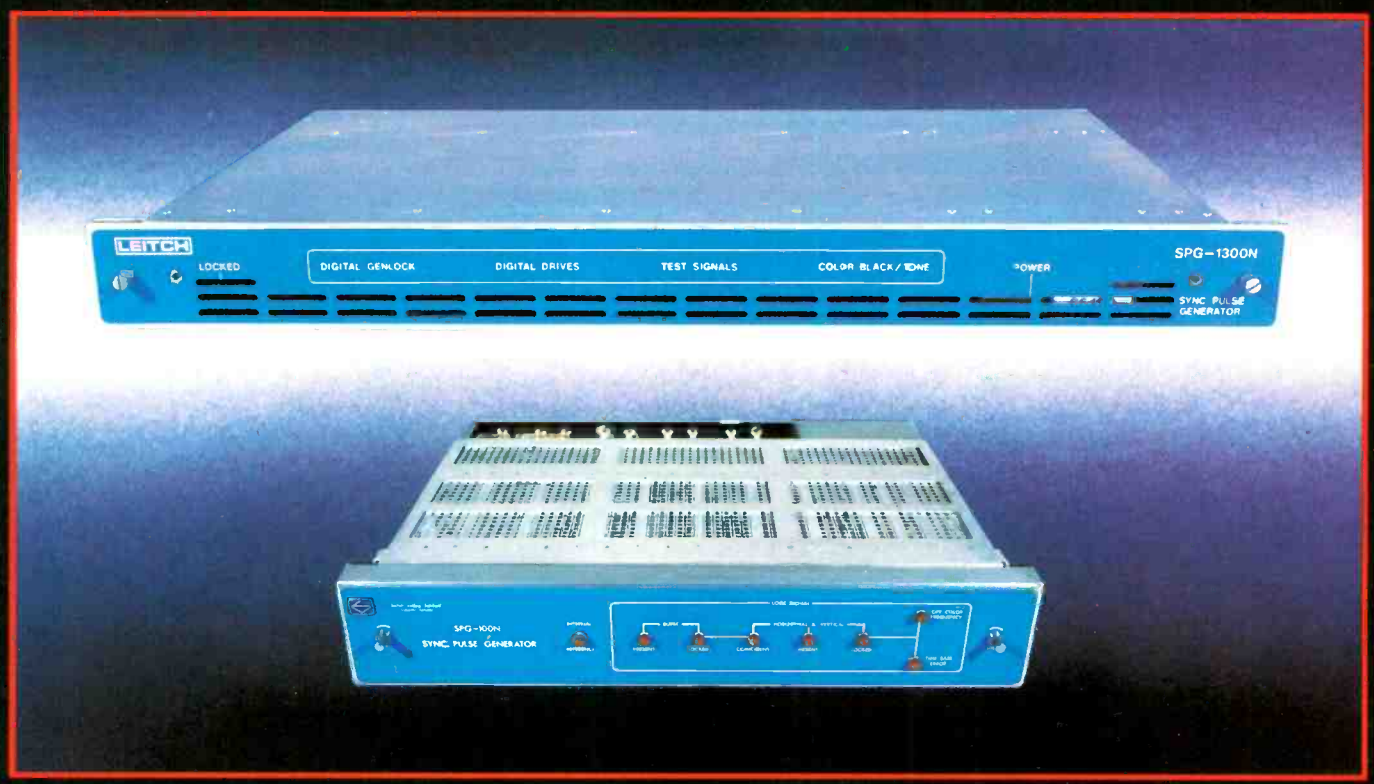

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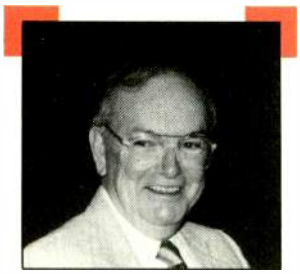
HARDMAN: I would envision our company getting into it sort of like we did color; we pass network first, and then go to videotape and finally studio cameras and local production.
OGREN: I think as Frank has said, the most logical progression would be to do network pass through, and then



"We feel that HDTV is something that will get us in the news, something that TV broadcasting needs right now."

—HARDMAN

eventually upgrade the studio equipment. It's going to be a tremendous capital investment. But in the competitive world that we're in right now, with all the pressure from cable, it's going to be necessary.
BME: Is there no advance planning that you can do now, for instance in wiring to handle the extra bandwidth?
OGREN: We did a lot of preplanning for stereo when we knew that was coming. But right now it's really difficult because we don't know what the standard will be.
WEISS: One of the problems is that while there is at least a first production standard for high- definition, it's unclear whether that's the final production standard. The final interconnection standard has yet to be determined, and economics will play a part in that. Let's suppose that 1125/60 is the raster form that will be used. You still have the question of do you want to send three channels in parallel everywhere or do you want to go to something like an S-MAC kind of approach, where you have one path through your routing switcher instead of having to have three levels. Maybe in the time frame that we're talking about, fiber optics at 1.2 gigabits will become economical. All of those questions are still open, even if you use 1125/60.

BME: If you had to outfit a new studio for 1125/60 today, what do you think the cost differential would be between what you're doing now and what you would have to do?
OGREN: I would guess probably about three or four to one.
WEISS: I would agree with four to one in the camera area, but I would have said more like 10 to one on tape recorders—higher if you want a digital tape recorder. I'm thinking of that versus MII or Beta.

BME: What about wiring? How much extra does it take to run 1125 around the plant?
WEISS: If you are doing it with the parallel that's there now, it takes three times as much cable and it takes, of course, three times as many DAs and patches and equalizers, delay lines and all the rest. And in addition to that, you need 30 MHz.

"One of the ways it's been proposed to achieve additional spectrum is to eliminate the taboos in the UHF band."

—WEISS

"If somebody comes along with a system that's better than what Sarnoff has developed to this point, that's fine."

—WEISS

BME: Are DAs and routing switchers available that are HDTV-ready?
WEISS: You can get a 30 MHz routing switcher now from four or five companies, and they've almost all got terminal gear to go with it. In fact, you can get routing switchers up to 120 MHz that I know of. The things that aren't there now in any great quantities are digital effects.

BME: What other elements are missing?
WEISS: I don't think there is a heavy-duty switcher yet. Grass Valley demonstrated a single mix- effects bank of its 300 switcher in high definition, but I don't think there has been any product on the market that has come out of that. Sony also has a switcher, but I don't know that anybody else is doing anything or not.

BME: So it seems that at this point there are almost as many questions about high definition television as there were a year ago.
WEISS: I would disagree with that. We may not have the answers, but we've got people's attention. And people are thinking about it and deciding what points have to be settled to finally come to a conclusion. The fact that almost everybody at this table now agrees that compatibility is required shows tremendous progress.■

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Digital Audio: A Qualified 'Yes'

At the 1988 NAB, trends for radio broadcasters included advances in digital audio and straight talk about making radio equipment reliable and affordable. "We don't have television budgets so don't experiment on us!" was the plea to manufacturers, along with requests for digital and analog interconnect standards.

Our panel was most interested in debugging CD for on-air broadcast and in R-DAT as an emergent production technology. Other issues included the digital audio workstation, MIDI and special effects generation for production, and touch screen technology. The consensus: Digital signal processing is exciting and modular purchase patterns can ease the way into hard disk capability, but in today's economy toothpaste will polish up CDs just fine.

Our panel included: Dave McKenzie, director of engineering for CRB Corporation (five AM, six FM); Larry Titus, director of engineering for Chase Broadcasting (three AM, three FM, two TV); Steve Davis, special projects engineer for Clear Channel Communications (eight AM, eight FM) and chief engineer for KAKC/KMOD-FM, Tulsa; and Jim Wagner, VP of engineering for Jacor Communications Inc. (five AM, seven FM). The moderator was Beth Jacques, *BME*'s senior editor.

BME: Can you describe any trend you see in digital technology, equipment or accessiblity for radio stations? Let's include broadcast and production.

DAVIS: At Clear Channel we're trying to implement chainwide digital CD (compact disc). We've generally found that after about six months or so you begin to have a lot of trouble with tracking. I think R-DAT (rotary head digital audio tape) has a lot more promise as a medium because of the controllable characteristics: you can dub parts of a song and you can maintain the formatted control you would have with a cart.

What we're looking for right now is to buy a single brand of CD player chain-wide so the manufacturer will be accountable to us and so we can set up a unified training program.

McKENZIE: CRB is going into compact discs very heavily. We started out with the Technics SLP-1200 but had problems. One is they "lock up" and "eat" the CD, so to speak, and will not let you take them out until you turn off the power and pry them open. The other problem has been skipping—mainly due to dirt finding its way into the transport and getting onto the rails. It doesn't have a worm gear, it has a linear motor which experiences resistance and then overcomes the resistance and slingshots you into the next cut, or somewhere down the CD. Who knows where you end up? It turns four-minute songs into two-minute songs. Sometimes the edits are real good.

DAVIS: It would be nice if we could do this under laboratory conditions and put machines in a test situation and monitor them but you're dealing with real live DJs and program directors. If the machine doesn't work the first day, they call immediately and say we can't use this stuff.

WAGNER: We're using the Denon CD Cart machines at certain radio stations and the Technics SLP-1200s in Denver, primarily because they have a varispeed. It's been our experience that we've had problems in both areas. No one really has a good understanding of the technology yet or knows if this is a problem inherent in the CD itself. We know now that you can scratch CDs.

DAVIS: They were introduced as indestructible and our DJs believed that and rolled their chairs over them—literally.

WAGNER: Nine times out of ten, the machine gets blamed, but now we're all kind of whistling in the dark.

McKENZIE: We've had problems

Engineering management says it wants the quality of digital audio—if the equipment works.

where a CD too dirty to play in one professional machine will play perfectly over in the production studio in a consumer unit. It's embarrassing not to be able to explain why this machine which costs ten times the price of a machine in someone's office isn't able to play or find the tracks or locate and cue up.

TITUS: Our solution at our Stamford operation, which is totally CD, is to run a bank of consumer machines.

DAVIS: We've been in CDs for about two and a half years, and now I'm running a library where some of the disks have gotten pitted. There's a motorized unit to clean them that works OK, but nobody wants to use it.

McKENZIE: We have a lot of what I call "pizza-fingers"; we've had to clean every CD several times. CDs have gotten so scratched they wouldn't play and we've been able to buff some of them out with a plastic polishing compound, like Turtle Wax.

WAGNER: Do you know what's a good plastic polishing compound—toothpaste! I discovered an additional problem while we were getting converted to CDs up in Cleveland. Before, I thought this was great, I can get rid of distortion inherent in a tape cart, we can go right on the air and I can do a little bit more processing because I've got cleaner audio. And I discovered I ran into a brick wall which is that now the programming people do not have control over the CDs. Here's a hypothetical situation: Say you have an Elton John CD, we as PDs don't want to play one of the cuts, and then we hear it on-air at 4:30 in the morning. That's a legitimate problem—so then you find the guys in production putting CDs on carts and you pull your hair out, because that just negates everything you're trying to do.

McKENZIE: We have that problem accidentally. People punch in the wrong cut number.

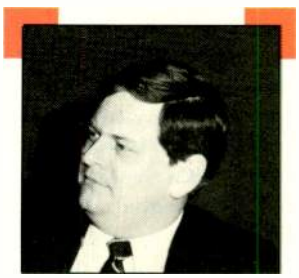
WAGNER: Or punch in the right cut number and it goes to the wrong cut.

DAVIS: Or so they would say if you were to call them on it on the air while they were running shift.

McKENZIE: Carts eliminate the skippage problem but the major problem now is now you have reduced your dynamic range.

WAGNER: All the advantages of the digital recording just went out the window. It seems to me you add about a percent to a percent and a half distortion when you go from a vinyl medium to a tape cart.

DAVIS: That's true and that's under ideal conditions. Unfortunately, we're not always in that situation. Try as you might to implement a training program, you've got DJs who read the meters in different ways; there's always a guy who likes to use the record input meter.



"I wonder if you couldn't store and transmit just MIDI information. It takes less space. You could have more radio stations."

——WAGNER

McKENZIE: CDs give you the consistency that you cannot get on carts. You don't have phase problems, you don't have noise problems. I do have a problem with consistency and quality of CD origination. We have some Century 21 discs and when I listened at home I thought my processing had gone out the window. I took the CD into the studio and found the piano was distorted on the disc.

DAVIS: This is a problem that has reached national proportions at this point. When I called Denon to discuss this, the very first question they asked was whether I was using any Century 21 discs.

McKENZIE: It's the same old problem. It's a matter of who's mastering—it doesn't make any difference what the medium is.

DAVIS: If we don't get CD players or machines like the Denon CD Cart within the next two years that work, I don't think compact disc will ever be a real standard broadcast medium; we might go directly to R-DAT.

BME: Do you think R-DAT will overcome any of these problems?

TITUS: I think R-DAT is a medium that is still in its infancy. The player I've been standing next to for two days takes a long time to access; it's a consumer machine

McKENZIE: Every R-DAT machine I have seen is a consumer machine. There are some problems inherent in the technology, including the locate and start up time.

DAVIS: The Tascam looks pretty impressive; it comes standard with rackmount and it's a large, fairly heavy machine similar to an ITC set-up. It's sort of a consumer unit trying to be a broadcast machine, but I think there's a lot of promise there. The front panel and user interface are overly complex.

McKENZIE: Has anyone seen the Peak Audio Controller for R-DAT machines at the Radio Systems booth? It was designed by the fellow who designed the Fidelipak cart machines. He's come up with a controller for R-DAT machines which will plug right into the Sony machine and basically take over all the stop/start and cue controls. It gives you three cue tones. One is built into the machine to begin the cut plus two auxilliaries. It also has the ability for quick access, previewing and jumpback.

TITUS: I have a concern with the R-

DAT cassette medium. Drop one on the floor and it won't take it like a cart. I've seen jocks throw carts against the wall in anger, pick them up, flip them into the machine and they work fine. This thing is not going to take that physically.

"If we found a context-sensitive package that didn't take years to implement, we'd jump on it."

—DAVIS

BME: Our panel also analyzed durability and environmental sensitivity of the rotary-head hardware format and—due to a lack of full standards—potential incompatibility of R-DAT tapes from one machine to another.

DAVIS: I think that with the small-size R-DAT cassettes you could cart up a library for single cuts. This would achieve better storage efficiency and digital audio quality.

WAGNER: We've been toying around with a music handling-type system where we have computer software in a number of R-DAT machines, for instance. We've talked with some people including Systemation out in Illinois. They use Sony 8mm machines, which is essentially the same technology but a lower sampling rate, so 15 kHz is still the cutoff. What I liked, though, is they've been doing this for a while using their software in their computer handling analog tape machines, so they've worked out most of the software bugs. That's a problem, according to my people. There are a lot of guys with good ideas which came out last month—or next month—but when you start talking about a computer and software, you start talking about a year to work the bugs out. Programmers just do not understand dead air, even in the service of new technology.

McKENZIE: What I see coming down the road here awful quick is the digital audio workstation that's primarily used with TV, putting sound in video. They have hard disk drives now. There's a lot of audio emphasis, and I can see the day when you might have four or five of those guys sitting in the corner with a computer controller and everything is on hard disks.

DAVIS: Then you've eliminated the operator and you can interface directly with your music rotation.

WAGNER: You can take that computer and tell it it can play these particular songs, but the songs we don't want, we won't put in.

McKENZIE: I think that hard disk is going to be the way it's going to go; I think it's going to step past R-DAT.

BME: That's digital storage and control, but what about R-DAT for field acquisition or production?

McKENZIE: In terms of news gathering, the quality of the audio machines we have now or would want to get—and analog delivers very high quality—is more than sufficient.

TITUS: Plus, there's a price problem. This is radio. We're hard pressed to spend 125 bucks on a cassette machine, so we're not going to spend $2,000 on equipment....

McKENZIE: That a part-time person will go out and drop.

WAGNER: It's been our experience with news people that they jump into the car and flip the thing in the backseat...

TITUS: And it dings off the rear window on the way.

DAVIS: They seem to take a certain pride in how roughly they can treat the equipment.

DAVIS: At Clear Channel we've developed our own music rotation software. Because we did that in-house, in the future it could interface with a hard disk-based instrument. I'm sure the big software companies are already working on that. It would be great if it could all be put together with a touch screen.

MCKENZIE AND TITUS: Put those two together and you don't have a console anymore, you don't have a jock dropping the medium, whatever the medium is, because there is no medium, there is no console, it's one touch screen and if they can make a touch screen that's gorilla-proof, you're there.

"The more you modularize, the more you minimize initial expense."

—DAVIS

BME: Do you agree, then, that the workstation is a viable product development technology for radio?

WAGNER: Well, I do. I feel that radio lags behind everyone else in the use of computers. If you think about it, the whole system from the accounting people for invoicing through logging, continuity for live spots, music handling and scheduling of music has one big computer that can do all of it.

McKENZIE: The only place in the building where there isn't a computer is the on-air studio.

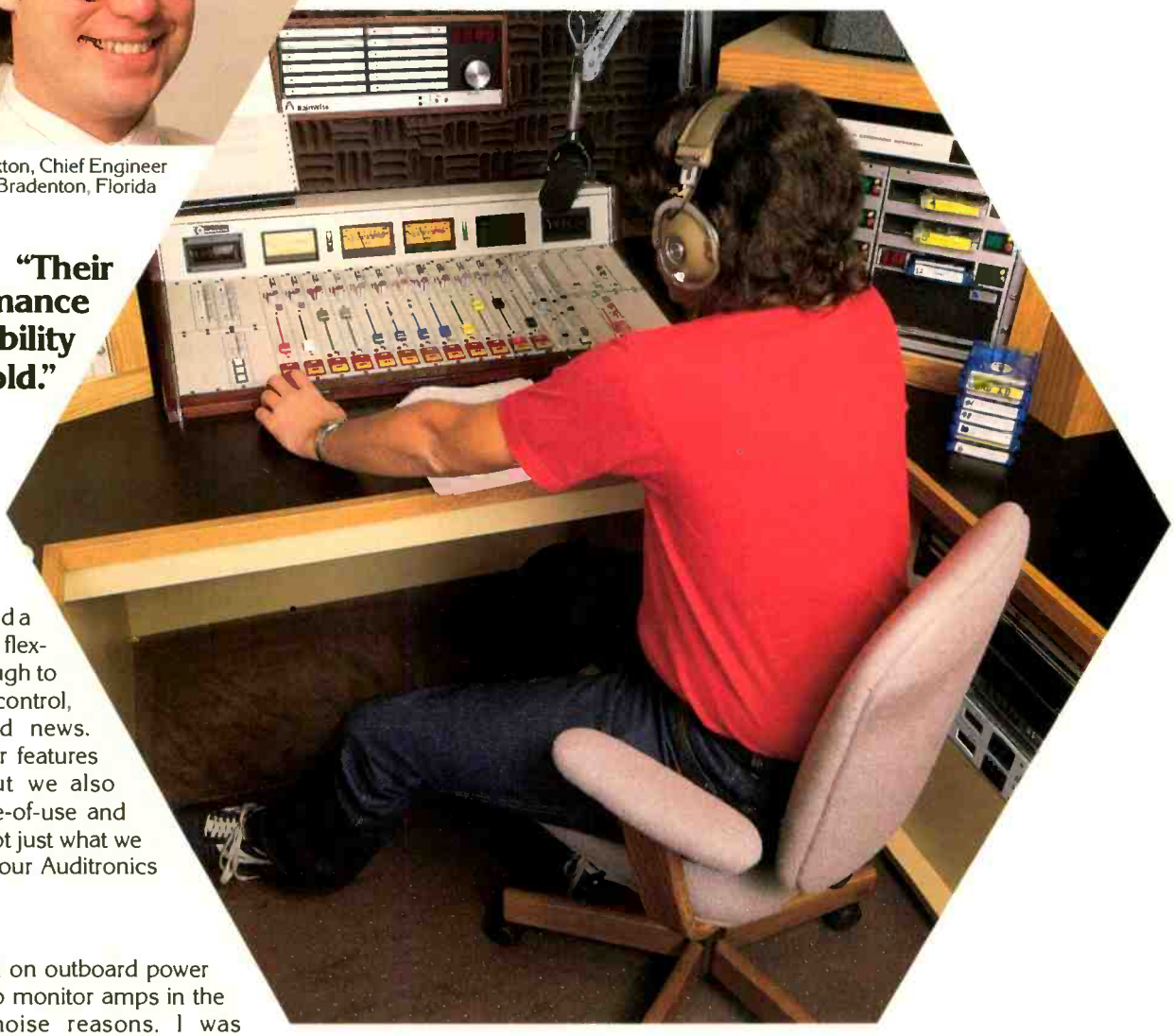
WAGNER: That's correct, and that's the one that needs it.

DAVIS: We're working on linking our systems together on one computer. The problem is that right now the hardware is out there, but there isn't very much software. Once we have that, we'll have a situation where the PD can create his playlist in his office and then he can go to air

"Features and specs sold us on Auditronics 200 consoles."

Robert Lankton, Chief Engineer
WDUV/WBRD in Bradenton, Florida

"Their performance and reliability keep us sold."



"We wanted a console flexible enough to use in master control, production and news. We shopped for features and specs, but we also looked for ease-of-use and reliability. We got just what we wanted in our four Auditronics 200s."

Features

"I insisted on outboard power supplies and no monitor amps in the console for noise reasons. I was impressed with Auditronics' VCA technology, which at the time was not available elsewhere. We wanted the self-contained clock and timer. We needed the switching logic to interface between the A and B inputs, (a neat concept most other consoles don't offer). And we needed a lot of extra line inputs to support our satellite feeds. We needed a first-rate telephone interface. Auditronics beat its competitor hands-down on this. And, of course, modular design was a must for serviceability. We got it all in the Auditronics 200."

Specifications

"We go for the widest dynamic range we can get because much of our programming originates on CD. So the 200's 3dB better S/N is really important. Everything on the Auditronics 200 tests out better than the specs they publish, and you can't ask for more than that."

Ease of Operation

"I found the 200 logically laid out and very easy to train our people to use. The jocks like them and can easily understand them, which is very important to management."

Reliability

"We're just ecstatic about the Auditronics consoles. They've run 24-hours, 7-days since turn-on without a failure. What's more, they've held their specs, which I check every month to audiophile standards."

"Would I buy Auditronics again?"

"At WDUV/WBRD everybody is happy with both the Auditronics consoles and the support we've received from the company. We look forward to doing business with them again." If you'd like to know more about why Rob Lankton swears by Auditronics consoles, call 1-800-638-0977 or contact

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and do his air system check and make sure it's coming out OK.

McKENZIE: We're finding people that are musically inclined are using time-based sampling systems to hang on to and retrieve and catalog their sound effects. People are going to the music industry and musical instrument technology because it's further along than radio.

WAGNER: Do any of you ever play with MIDI-based synthesizers? They have gotten good at reproducing lots of different instruments and sounds and with MIDI you can control all that information. Some place down the line I wonder if you couldn't store just the MIDI information and every time you replay a particular piece of music, you replay it from the beginning with a synthesizer.

McKENZIE: Isn't Fairlight doing that now?

WAGNER: You can even go further down the road and say "I've got a radio station, I'll just transmit the MIDI information into your synthesizer at home" and it will redo the music.

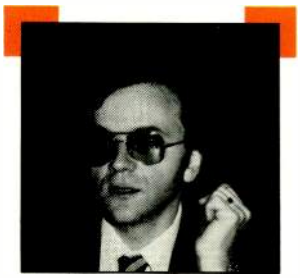
McKENZIE: So, we're a data service?

WAGNER: That's basically what we're doing anyway. We're transmitting information, whether it's supposed to go via modulation or whatever. But that's something that I see maybe way down the road. You can obviously store MIDI because it requires a lot less storage or transmission space. We could have more radio stations. They'd love that.

"Programmers just don't understand dead air, even in the service of new technology."

——WAGNER

DAVIS: One thing we're looking for right away is something that will help our morning team shows that use a lot of pre-produced bits—comedy bits, songs, singalongs to vocals off records, that sort of thing. Some of the material is scripted. And they spend as much time in the production of that material as going live on the air. You know how radio uses up material faster than anything in the world, so what we're trying to do is store all that stuff on a disk-based environment and integrate it with a context-sensitive database, one that includes a look up-type of function. Then you could contain an idea and retrieve all the information about it. If we found a package that didn't take years to implement, we'd jump on it immediately because we've got carts a mile high.



"This is radio. We're hard-pressed to spend 125 bucks on a cassette machine."

——TITUS

If we can't do something based on disk audio, we'd like to have the carts themselves plus the textual script of bits that weren't included in a database where we can search for them by theme or words.

McKENZIE: The CompuSonics floppy disk system is a disk in a hard case that holds about seven or ten minutes worth of audio on each. That's long enough to do a song. The IMS Dyaxis system has two workstations. It's hard disk space and both of them have editing capabilities. The Dyaxis is a little better in that it does cross fades. It does splicing, you can remove little pieces of audio. All these workstation environments for digital are basically built to speed up editing. The nice thing about the CompuSonics is that you record a song you want digitally; then you take it and edit it and you can store three different edits of that song all on the one disk or hard-cased floppy.

DAVIS: You could do your own edits on CDs and track past intros or rumble up to the cue on LPs and take out objectionable words. It would cut down cueing errors when you have to track through.

McKENZIE: Text information to go along with the music would be very helpful for digital formats. There's plenty of room in the CD subcode to furnish that or in extra space at the end; discs hold 73 minutes and they're rarely filled. That's important when you go to the Denon-style case, because now the CD is nude riding around in a plastic box and of course you've lost the liner notes. Another area where you need to store text information with material is when you catalog and retrieve sounds.

BME: Can you estimate any timetable for the digital radio station? Someone said "Digital will happen, but it won't start with us."

WAGNER: I don't think radio will be on the leading edge of digital.

TITUS: Radio hasn't been on the leading edge in years.

McKENZIE: It's going to come through consumer products or television stations.

WAGNER: I think consumer will be the driving force because television is going to be faced with the same problems as radio. I think digital workstations just depend on the cost. Right now we see escalating prices for radio and TV stations. There are a lot of them being sold and the asking price is based on a multiple of cash flow. Consequently the people who are selling their stations are trying to increase their station's cash flow. There are only two ways to do it: increasing revenue or decreasing expenses. Engineering is traditionally an expense, so consequently owners don't want to spend money on equipment. Then af-

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ter someone buys a station—which he probably purchased at a high price—he must increase his cash flow to service the debt. So either way, it's a double whammy and the technical end is where they look to cut expenses.

DAVIS: Even though there's a lot more money to be spent in

"So, now we're a data service?"

——MCKENZIE

television stations, it's still a limited market—in terms of how many of them there are, how much equipment they can absorb—or afford to absorb—and in whether there's much room for growth in television itself. One route radio stations might take is to modularize their purchases rather than equipping whole studios from scratch. For instance, we're computerizing our morning show.

McKENZIE: I think improvements in audio will tag along with video editing systems. Audio will follow effects and the technology will have to be built so the audio can be manipulated as fast as the video.

McKENZIE: An area I'd like to see developed is digital wiring. Currently if you have a CD player and you want to put that material onto R-DAT tape, you have to go analog. So you've got two conversions

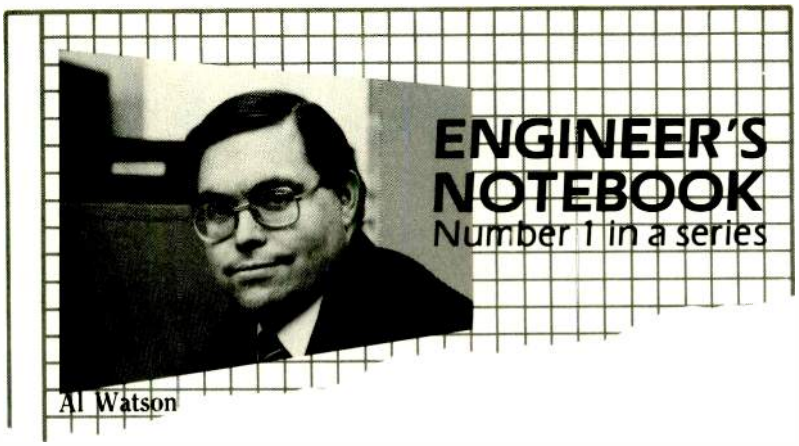
there, which shouldn't be done. Thanks to the problems in the consumer industry, the radio stations may not get the best quality they should. We don't have a digital output that can be patched in—so there needs to be a digital data standard. There need to be additional audio data standards, even though we have enough of a standard so we can connect things together, even though we have to get our interface box.

DAVIS: There are some exciting things happening here in effects. As far as digital production tools, Lexicon has developed a lower-priced model for reverb and echo and so forth. Formerly they only had high-priced high-end recording stodel models, but now there's one with stunning quality in the realism of the echo. The plate echo didn't have artifacts.

TITUS AND McKENZIE: They're competing against the Yamaha SPX-90II and the new Eventide harmonizer.

DAVIS: I liked the CompuSonics data-retrievable system and some of the workstation keyboards—particularly the Fairlight—and some production tools, but there's nothing so new and exciting that I would stock in immediately. If it's still out there next year, maybe there's a chance it's going to stick around and then we'd think about buying it.

WAGNER: I think we all agree that maybe in five years the hard disk technology will be there. It's basically putting audio on the system. I think that in five years we'd all like to get rid of carts, but by then maybe we'll be beyond CDs and R-DAT and into hard disk storage and that's where I'd like to see us be.■



N/DYM™ Technology Comes to Broadcast Microphones

By Alan Watson, Director of Engineering
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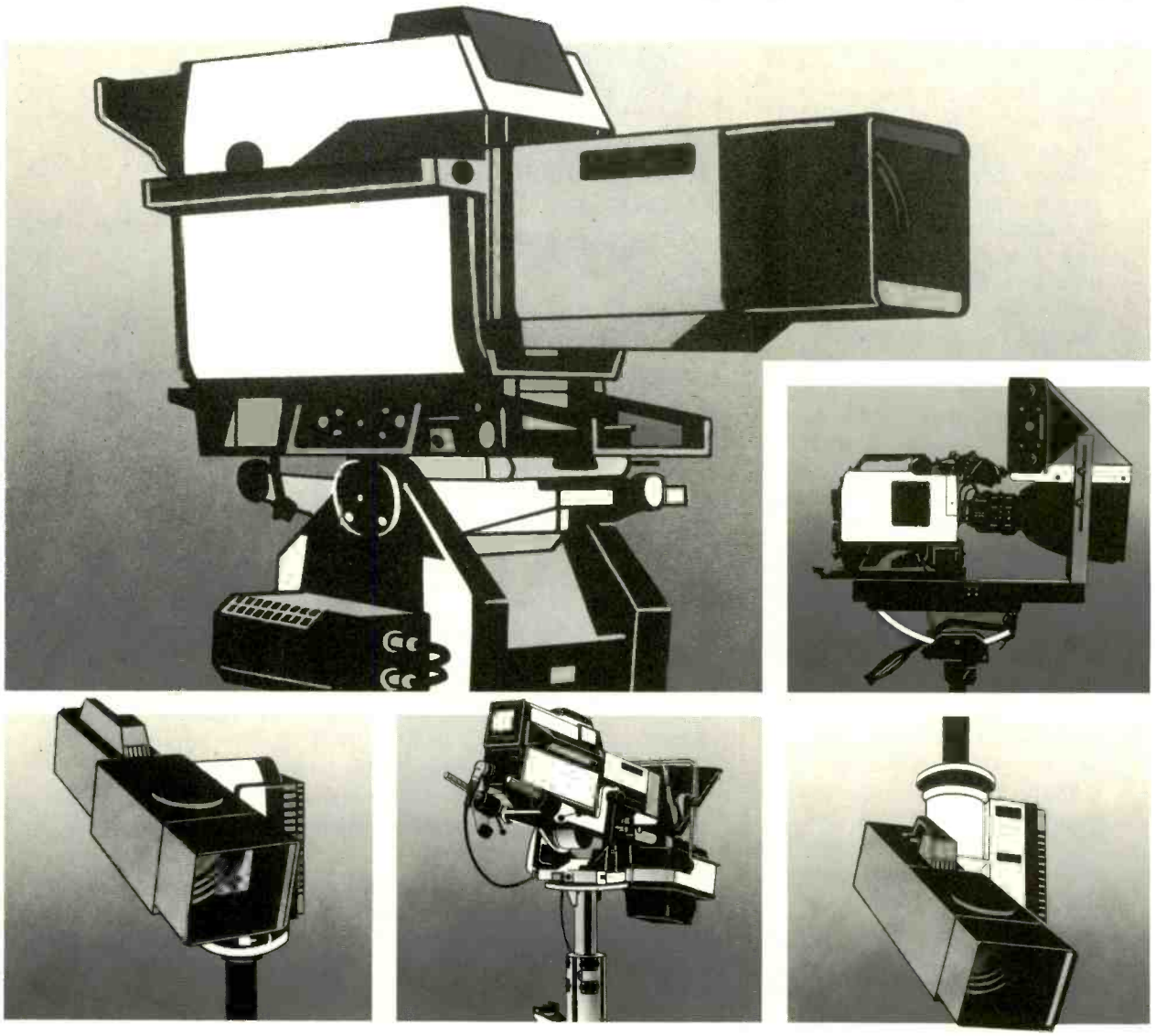

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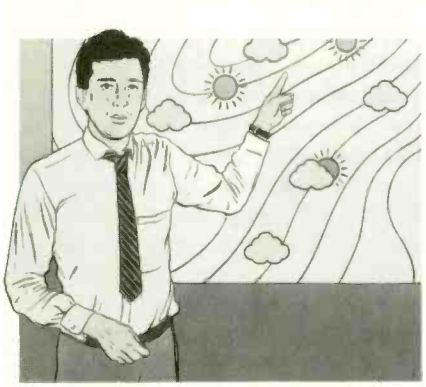

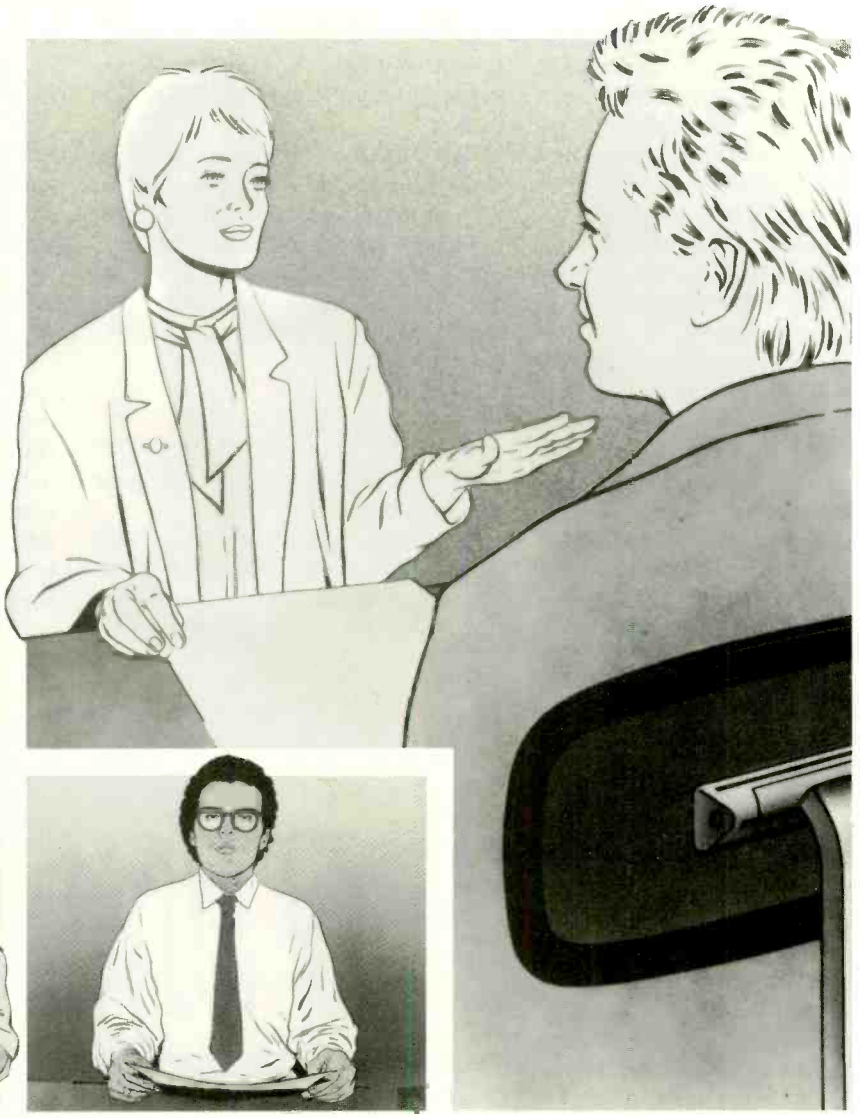

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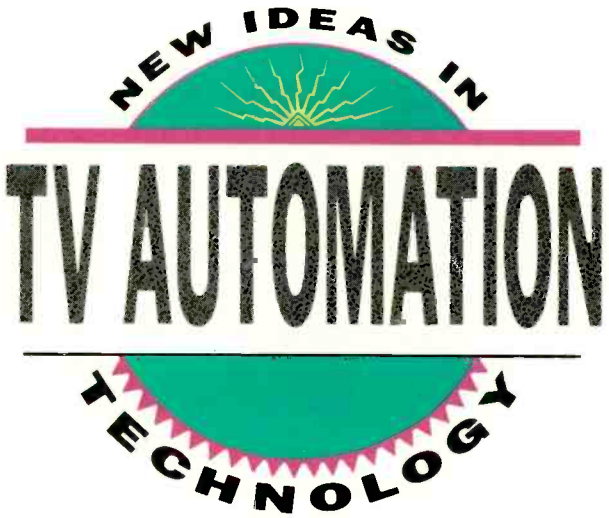


TV Automation: Cautious Optimism

Automation is the way to go, our panel agreed. But not all the pieces are in place yet.

The bottom-line pressures that affect broadcast engineers everywhere are spurring interest in studio automation systems. The engineers who gathered to give us their views on automation were serious about cutting costs in their operations—but not at the expense of quality and reliability. They praised the hardware development behind the new TV cart playback systems, but remain cautiously optimistic about the control software. And they see plenty of room for growth in RS-422 machine control.

Participants were Robert S. Murch, vice president of engineering for WPIX, New York City, one of Tribune Broadcasting's six TV and five radio stations; Fred J. Steurer, vice president-engineering for Pulitzer Broadcasting Co. of St. Louis, MO, owner of seven TV and two radio stations; and Tom Mikkelsen, director of engineering for WTMJ, Inc. of Milwaukee, owner of three TV and four radio stations. *BME* editor-in-chief Robert Rivlin moderated.

BME: What have you seen on the floor of NAB this year that's piqued your interest?

MURCH: Our company has been waiting for the right cart machine for a long time. We still have the older TCR-100s and ACR-25s on line, and we determined that this year we're going to buy or order cart machines. That brings up the question of how we connect to traffic.

MIKKELSON: We've talked to Ampex, Sony and Odetics about how their cart machines would interface to traffic systems. Odetics is further ahead on software than anybody else, no question about it. And it's not only the playlist. It's also a record list, such as for time-shifting program material and network delay. Our KOAT in Albuquerque network delays all year long and our Fort Wayne delays only in the summertime. Why not have the cart machine also do that? Odetics can do that right now. Sony claims they want to record in their machines some day.

BME: Are you talking about the Betacart or the Library Management System?

MIKKELSON: The Library Management System. We've discounted, for our operation, the 40-cassette Betacart, specifically because there isn't a lot of savings in manpower using that. We have 24-holder ACRs and TCRs, so there's no big difference in going to 40.

BME: Are you interested in the question of D2?

STEURER: For us, the issue isn't specifically D2. It's the speed of the Ampex transport that has converted me. We're talking about the cassette entering the machine and seeing video three seconds later. The Sony transport is much slower.

MIKKELSON: Fred is absolutely right. The one thing that really got my attention was the ability of the Ampex machine to move that fast.

We've all been waiting for the robotics hardware to mature to a point where we as engineers felt comfortable making a decision. We're at that point today. Odetics has product in the field and it's a great system. Ampex is showing a machine that is really working and doing a first-class job. Sony finally came out with a real live product rather than a prototype. Panasonic is beginning to ship product to the field, so I'm very interested in watching that continued development. The robotics systems have matured to a point where we're ready to buy them. Now we have to watch the software and see the software

cycle fully mature and grow.

MURCH: I think that's a big issue too. We're asking these machines to do a lot of things. We're looking at delayed broadcast; we're discussing the possibility of compiling spot reels for news operations, doing split feeds for separate networks with a different set of commercials locally, recording incoming feeds, turning shows around. I think we have to take a very hard look at what this means as far as reliability in failure modes.

MIKKELSON: There are a lot of television stations out there where a huge library system is impractical. The Odetics is sized just right for a situation where your labor costs are low enough that you don't need to implement a giant system to achieve efficiency. In my situation, I would look at a library management system for the primary, on-air operation and then purchase a smaller machine for news operation. On-air library management automation will be where I can achieve the greatest cost savings. The next greatest level of cost savings is automating the newsroom.

MURCH: Or remote control cameras. In that regard, I think I have to recognize the people at Dynatech NewsStar for listening to us as customers and visionaries. They have absolutely done the right thing that will be significant force in our market. We recently put in Vinten remote control cameras, and one of the reasons we selected Vinten was there is a little switch on the side to disable the automation so a camera operator can run it in the conventional manner.

BME: Do you think that newsroom computer interface is going to become one of the control options?

STEURER: We've followed NewsStar almost from its inception and it's really maturing. There is another one out there, Carl Twentier, that's worth taking a look at. He's come from nowhere in a short time. Through his type of software architecture he is able to guarantee no slowdown at four in the afternoon and it also maintains an online morgue so you don't have to go offline to do a search.

MIKKELSON: The other thing I saw, though I don't think they've got it to a point where they're going to be talking about it out loud, is what Dynatech refers to as their total automation system. They're talking about communicating with the router, software that would drive satellite dishes, software that would drive VTRs and do these automatic recording functions, and tying it all together.

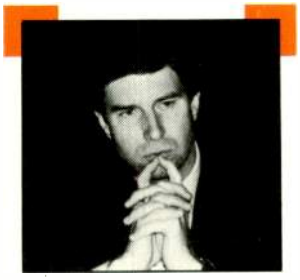
BME: Do all the systems work now with the billing systems? You mentioned that was one of your prime concerns.

STEURER: Well, they do and they don't. It seems like the three companies that we interviewed will take, in one fashion or another, a feed from the traffic system. But traffic systems will have to take a feed back from the machine in order to reconcile and send the bills out. And until that loop is closed, we're not going to have full automation between departments within a single station.

"Machine control in our stations is generally a hodge-podge. It's not one standard system for all the stations."

——STEURER

MURCH: We have that already with our Jefferson Data system. We also have a system called Spot which airs our commercials and we check the E-bus on the card against the house number on the log electronically. If you're working in a cart room for five hours, carts 3691 and 3961 may start to look a little bit alike. If you get this



"We don't have any standards right now, so I don't see how we can be hurt."

——MIKKELSON

temporary dyslexia, the system would catch it. This is something we did with Dubner Computer Systems.

STEURER: There should be some standard in all of that. Some agreement that this is the message we are gong to feed back to you so all the traffic systems can say, "We can take a feed from anybody" and mean it.

MURCH: Standards are tricky, though. We're noticing this even with RS-422 machine control. You start finding little dialects. Someone makes a little extra command because it's handy. Do you really want to stop that sort of innovation?

MIKKELSON: We don't have any standards right now, so I don't see how we can be hurt. If we had the agency number, independent of house number, and some start message and end of message times, that's light years. And not only that, but just having those times will force people to conform to length of spot. That's another major issue.

MURCH: I would say that our experience in New York is that if we tell them its 30, it's 30. It's rare that we get a 31- second or a 29-second spot.

STEURER: That's another story with local spots in the smaller markets. They may be a little sloppy, so you can't go, at least in our systems, with a timed thing. It has to be sequenced, one behind the other, in order to keep the show tight.

MURCH: I think it requires a certain

discipline to get into automation, and not every station can set that up.

MIKKELSON: Stations planning to automate have to understand that they are going to have to conform to a system. In order to achieve some level of auto- mation, I think it is a foregone conclusion that you're going to give up some flexibility in some areas.

MURCH: Also, people get very accustomed to the automation working. And then one day it doesn't work and they have to do certain things manually, and their skills may be rusty.

BME: What's going on in radio station automation?

STEURER: We just have the two radio stations and one of them is news/talk and sports. There's no real program automation.

MIKKELSON: The reason we all get excited about television is that our labor costs are very, very high. And our cost per spot is very high. I think that when we look at the radio market, not to downplay that, but the cost per spot is not that high. The economics are completely different, and an audio cart machine is cheap. I really don't believe that there is a significant amount of cost savings that can be achieved by overall radio station spot automation.

MURCH: Radio automation also includes bringing in the satellite. I know at least one radio station in Vermont where there are very few people on staff, and they largely just deal with sales.

STEURER: For those stations that use satellite feeds for non-live program material, that's almost a natural.

MIKKELSON: The problem with television automation is the volume of data. There are times when you just get overwhelmed by the amount of information, as opposed what I've seen in radio stations.

STEURER: There are some cases in television where we're recording from several satellites at the same time. Several years ago it was great to have a satellite dish. Now I walk out the back of one of our stations and there are seven dishes there. When you hear Ampex talk about being able to control 400 different machines with their software, you start thinking about running these satellite dishes around the clock and automating your whole record schedule. Our Louisville station timeshifts 150 hours a week. To keep all that straight is becoming overwhelming.

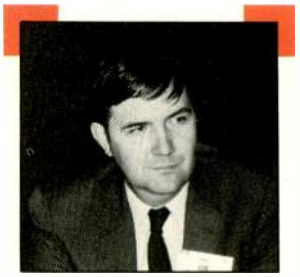
"The person who wants it the worst pays for it, and then it's distributed free to everybody else."

——STEURER

BME: Let me move to a slightly different area now—automation of things like production switchers. How is that going?

MURCH: I can envision a scenario where the producer and writers get together and write the script on what we now call the newsroom systems. They can have camera shots and that sort of thing on the script. This information can be loaded into a computer which controls all the things we discussed before—studio cameras, character generator, still store—but also the switcher and the audio console. So you just hit one button go to shot one and the correct mics and everything else kicks in.

You also see more and more of E-MEM-type device. Those devices are almost indepensable in today's production environment. There are times when if we ever lost E-MEM, I wonder if we'd get the news on tonight. The great thing about E-MEM is that it allows us to have repeatability of the look of our newscast.



"RS-422 is great as far as it goes, but I don't think we're seeing the neat, integrated machine control systems that we could."

——MURCH

STEURER: In two of our stations, we've put in the Ampex AVC 33 switcher with the Star and disk drive and we intend to do two more this year. Each director can load the disk in and that preprograms the switcher for the events that he's about to do. The nice thing with something like an Ampex switcher where you have that little monitor, you can set the background colors and the clips and all that sort of thing. It's absolutely repeatable.

BME: Do you feel that that technology is now satisfactory?

STEURER: I don't think it's even begun.

MIKKELSON: Look at the audio guy. What does anybody do for the audio guy? I think there are a couple of boards where the computer will set up

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a few things, but I don't know how much that helps you run a live news show, for example. Those particular production elements are very immature. I guess as engineering managers we're spending a significant amount of time on the areas that will be most cost- effective for us. There are not any major cost savings that we'll be able to achieve by integrating audio console automation or switcher console automation. What it will allow our people to do is execute more complex events and to do it more reliably and efficiently.

BME: What about machine control? Are you happy with the way that has come along?

MIKKELSON: As an engineer I'm pretty happy, in general, with the advent of SMPTE RS-422. I don't see any major problems with it, although there have been some problems with how some machines address RS-422. I need a tape machine that has the ability to be controlled via an RS-422 port, but still leave the front panel active so I can run up and hit the play button if I have to without worrying about that remote port. Sony in particular has a feature whereby the front panel is active and still controllable through a remote 2 or remote 3 port.

"Just because we're the first person to ask for something doesn't mean that we should have to pay the development costs."

——MIKKELSON

MURCH: We're in a unique situation. We have a custom machine control system made by Dubner Computer Systems. One of the reasons we went to them was there were certain things we were looking for, in machine control that we didn't think were available in the other systems that were out there. We felt that the Dubner system that we came up with had a lot of flexibility. I think that the RS-422 is great as far as it goes, but I don't think we're seeing the neat, integrated machine control systems out there that we could. I think some work has to be done in that area.

STEURER: Machine control in our stations is generally a hodge- podge. It's not one standard system for all the stations. We have several Utah Scientific master control switchers, and one station elected to put a panel next to that with just manual pushbuttons on it. We're just not really into machine control per se yet.

MIKKELSON: I think that the majority of the world continues to sit out there in GPI mode.

MURCH: That's too bad. Our experience with this uses RS-422. In effect, we treat every machine like the Sony 2000. It's not like it was a TCR-100. We find that it works very well. If you want to transfer a commercial to a TCR-100, in our machine control system some machines can give commands to other machines. So you hit the record button on the TCR-100 and the command to roll a select VTR goes through it. You don't have more wires just coming off the back of it. As far as cueing the machines up, it's easy to recue if you've made a mistake, and gang rolls become very simple. We control a still store which does not have a standard RS-422, and it's helpful of course to have Dubner or somebody do a little custom software for you. But you can do a lot of neat things with it. We can control the on-air still and the preview that's in the buffer. When you change the scheduling of events in the automation system, it dumps everything you sent into the still store and quickly reloads it. Things like that are very helpful.

MIKKELSON: We don't want to reinvent the wheel. If the manufacturers would simply listen to us as users, and give us products that we could all use, we'd be very happy. There will always be custom applications for people who have special applications, but when you look at the bulk of broadcasters out there, there are just a couple of ways of operating with a few variations on the theme. And it's unfortunate that we have to resort to high-end, expensive custom products.

BME: Maybe it's necessary that there be custom things until the market takes off.

MIKKELSON: I think there have to be relationships between those of us that are in a leadership role and the manufacturers. And there has to be some willingness on behalf of the manufacturers to work with us. And for those of us that ask for something, just because we're the first person to ask for it doesn't mean that we should have to pay the development costs.■

NEW IDEAS IN

TRANSMISSION TECHNOLOGY

Transmission: Cost-Effectiveness Prevails

Nowhere is the need to maintain a constant watchfulness over the bottom line more apparent than in the area of transmission. As revealed by our focus group, whose participants included Gerry LeBow executive VP of Sage Broadcasting (soon to be owner of 21 AM and FM and one TV station) and Wes Becker, technical director of Family Services Inc. (four AM and 17 FM stations), technical and engineering management is keenly aware of such technological advances as solid-state transmitters, remote monitoring equipment, automated test systems and the like. But over and over in our discussion, moderated by editor-in-chief Robert Rivlin, the question was: does the new technology make economic sense to our operation?

BME: You've spent time on the exhibit floor. What's interested you, so far?

BECKER: Well of course we've been looking at the newest transmitters that are on display. Both AM and FM. One that immediately comes to mind is Continental's new 8 kW solid-state model. We're also looking at the QEI transmitter package.

Another area I'm exploring is monitors—Belar is coming out with a new frequency-selectable RF amplifier for modulation monitors that can be located in the studio at some distance from the transmitter site.

BME: What about other equipment?

BECKER: We're considering a number of new low-power FM translators. There's a Report and Order about to come out that will authorize establishment of educational translators outside the range of a broadcast station. Along with the translators, we are looking at the most economical transmission method for multiple downlinks. Even though 21 may already seem like a lot of stations, we're talking about the possibility of 100 or 200. What would be the most economical downlink?

If you're going to have a lot of them, downlink cost becomes more of a consideration than the satellite aspect. The link in the receiver is not a cheap piece of equipment. If we look at a little 1 or 10 W transmitter, what is that going to cost? Do we want to put a $4,000 receiver in there? How big a dish do we have to have? Then we look at the method of transmission. Are we going to go with a composite FM that just zips into the transmitter, or are we going to come in with audio and have to put in a stereo generator? They're not cheap.

BME: Do you have any doubt that the next transmitters you buy will be solid-state?

LeBOW: I think it's wonderful to do away with blowers and tubes that wear out—they decrease our efficiency. Solid-state is a significant improvement. You

Despite several new technological advances, transmission remains an area in which engineering's nose is glued to the bottom line.

pay for it up front; but in the savings in efficiency, on the power bill and on the repair and maintenance of the transmitter; it's a good investiment.

BECKER: I have a concern about the efficiency of the solid-state transmitter as it relates to the power. We're not a big network with a huge, commercial budget and we want to know how much electricity the transmitter consumes. It turns out that at some power levels, solid-state FM transmitters use as much power as a single-tube model. For example, we did some checking on the new Continental 3.8 kW solid-state model and it appears that that wasn't significant efficiency difference between it and a single-tube 3.5, with a single tube. And they're 10 to 15 percent more expensive to buy in the first place.

LeBOW: Generally there is some efficiency—just because you're not sucking filaments and blowing hot air around.

We also have a special application at one of our stations where we only have room for a 5 kW transmitter that's 28 inches high. A tube transmitter would never work there.

BECKER: High-power AM is another matter. We're involved in a joint development program with Nautel to come up with a solid-state transmitter for one of our stations that needs a 50,000 W unit. It uses a lot less electricity than a comparable tube-type transmitter.

There are other attractions, too. You're using a number of lower powered amplifiers in parallel, and so if one goes out you can continue to operate. And you don't worry about the tube dying.

LeBOW: It cuts down on the number of calls in the middle of the night.

BECKER: As far as safety is concerned, you don't have the high voltages in the transmitter itself.

"We actually bought an NRSC filter for a competitive station who wouldn't do it on their own."

—LeBow

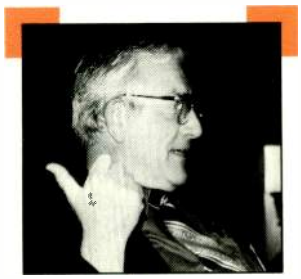
BME: Turning now to the NRSC standard, where do your stations stand?

LeBOW: We've already done it on some of the properties; and we're going to do it on all of them. We actually bought an NRSC filter for a competitive station who wouldn't do it on their own. We're a news/talk station and they're a music station, so we're real mild in our modulation and they're real wild. I couldn't find another solution, I did as much as I could. We went independent sideband using the power side from Kahn and moved all our energy up, away from them. They're 20 kHz below us, and that helped a lot. But there was still chatter.

"There's a Report and Order about to come out that will authorize establishment of out out-of-range translators."

—Becker

They just didn't think the economics were there for spending $450. So I went out and bought them a filter and installed it in their station. It sure made my life a lot better.



"Soon all our stations will be completely automated and basically unattended, with satellited programming, PSA community affairs material, and a transmitter."

—Becker

BECKER: We're building a 5000 W six-tower AM station in Sacramento right now and we will be putting in Inovonics NRSC equipment.

I'm really pleased that the effort is being made to improve AM, because it has definitely deteriorated. And the receiver manufacturers are going to follow our lead.

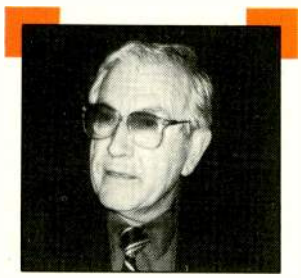
BME: What are your thoughts on FMX?

BECKER: We've got to look at the cost, but if that will extend our range, on these little peanut signals, it might be worth it. And I'm sure the cost will come in line when they begin selling more units.

LeBOW: We were involved with some of the original tests on FMX with our station WZFM in White Plains, New York and in the early days, when the amount of noise reduction was greater, the amount of multipath was

quite significant. Our station chief was also the chief of WLTW in New York, which was doing a lot of FMX field testing and he was experiencing big problems with multipath.

They're reversing the phase and doing some changes in the amount of compression, and I think it's a very reasonable signal. The receiver manufacturers will come across with a



"A big help has been our remote control system. We have 16 stations on-line, all over the country, running from a single location."

—BECKER

quantity of receivers because it's cheap and it's a feature that they can sell for another $30 that costs them $2. And, that always gets them.

The big problem with FMX is that if you don't get the incidental phase modulation out of your FM transmitter before you put on FMX, you'll woe the day you ever did it. You just put all that additional energy in the L-R baseband, and if you've got all that AM product in there it's going to make life a lot worse.

BME: What are some of the other issues affecting transmission?

LeBOW: What I've found interesting at this show is the number of technical papers given about AM incidental modulation on FM as if it was a revelation in the last year. It's probably been known for 50 years that if you've got up all this stuff whipping around on the top of an FM carrier it isn't good for reception. It sounds like multipath, if you have combiners with two transmitters that are phasing with each other, you get sounds that everybody blames on multipath.

BECKER: We have that problem at our station in San Francisco. We're running two AEL 25s into the combiner.

LeBOW: You get into that AM modulation, and it sounds like multipath.

BECKER: Yes, it sounds like multipath. It's hilly country around there, and when I'm driving there are times when the signal is clean as a whistle and other times when it's terrible—just like multipath.

LeBOW: But it's not real, and I think people are going to have to come to grips with it. Radio Design Labs has built a box that helps to do incidental phase modulation measurements of the transmitter—a little rack-mount unit with an LED. You simply crank and crank and tune for minimum incidental modulation. You can't do it with a modulation monitor because they have de-emphasis when you look at AM noise and you can't tune with de-emphasis.

BME: In the area of test equipment, do you have any interest in automated measurement systems?

LeBOW: You have them from a couple of companies. Audio Technology has a unit with an audio sweep and distortion analyzer with a digital

"Solid-state is a significant improvement. You pay for it up front; but make it up in efficiency, on the power bill."

—LEBOW

readout or a printout—it's totally automatic. You can run any audio signal source through it and it is analyzed. But we don't have one of those systems—it's just not necessary for us.

BECKER: That leads to the whole

"The big problem with FMX is that if you don't get the incidental phase modulation out of your FM transmitter before you put on FMX, you'll woe the day you ever did it."

—LEBOW

question about the changing role of engineering in general. As a non-commercial operation, we're always looking for ways to reduce what we have to spend on hiring engineers at our stations. A big help in this direction has been our remote control system. We have stations on-line, all over the country, running from a single location on a Hallikainen system. Once every two hours each station automatically dials into the operator's computer and reports its status. If there's anything wrong, it dials in right away and the operator can communicate with the remote monitoring computer to determine the real problem.

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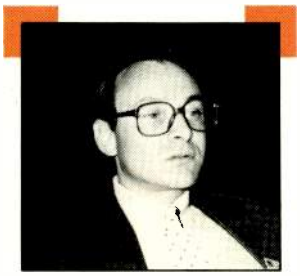
that way. We'll be completely automated and basically unattended, with satellited programming, minimum local, PSA and community affairs material, and remotely controlled transmitter operations. We'll have a person in each station for couple of hours a day, and a contract engineer on call.
LeBOW: We like the Gentner talking remote control. It monitors your preset parameters, makes some very limited judgements, and calls if they get out of line. It uses a voice synthesizer to tell you what's wrong—'hello, this



"The problem is that while UHF is coordinated in many markets, VHF isn't coordinated at all. It's grown up for 20 years, and nobody knows who is on there."

—LeBow

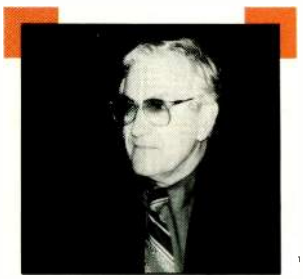
is Monitor One calling. Transmitter power 2.5 kilowatts below limit. Please call me back.'

It then allows you to use any touchtone phone to call back, enter a password code number, and functionally access the transmitter to do all the procedures necessary to check out the problem and maybe fix it. Let's say the plate is gone. You punch in a number to see if you can turn it back on. It takes a reading and says '9 kilovolts, 3 amps. SWR 1.02.' And you say 'that sounds about right. Goodbye.' It says 'goodbye' and hangs up.

"What I've found interesting at this show are the technical papers on AM incidental modulation."

—LeBow

We have one transmitter located on a mountain top that's very difficult to get to, especially in winter. The Gentner unit just sits there and watches what's going on, and calls when it's not feeling well.
BECKER: We have one system for our FM and a different one for AM. For AM, we use a TFT remote control and interface our computer with the studio control unit. The disadvantage is that you lose your link to the transmitter—you don't know what happened out there. So, for the FMs, we have the Hallikainen unit right at the transmitter. We can come right into it. And it's battery supported.
LeBOW: One problem with these automated systems is that they're so persistent. It was a Friday night—I wanted to get home in the worst way. There was a big ice storm and we had started a modification on a broadband antenna that we hadn't completed, and we didn't have heaters. There must have been six inches of ice and the antenna just dumped. The Gentner called. And it kept calling.
BECKER: We've had that problem. Too many calls—it just does its thing, it's low, and so it calls you.
BME: What else has excited you at this show?
LeBOW: The RPU units that TFT showed, where you can remotely program both the transmitter and receiver for three parameters using a modem.
BME: Is it true that the FCC's way of dealing with auxiliary bandwidth allocation is not working properly?
LeBOW: The Commission's rule now is that you can use any frequency you



"I'm really pleased that the effort is being made to improve AM; it has deteriorated. And the manufacturers are going to follow our lead."

—Becker

want as long as you got a license and as long as you're going to stay up there for a certain length of time. It's literally unlimited. The problem is that while UHF is coordinated in many markets, VHF isn't coordinated at all. It's grown up for 20 years.
BECKER: It's also fundamental that you only use as much power as necessary to do what you have to. On frequency coordination, I think that efforts are being made around the country to coordinate STL allocations and other trouble spots. I know it is being done in San Francisco.
LeBOW: In New York and Connecticut, we have 450 and 950 coordination well set— I think we know about everything. I had to put a 950 in in Hartford, I picked a frequency, we changed polarization to vertical to avoid another user who was horizontal, and it worked like a charm. ■

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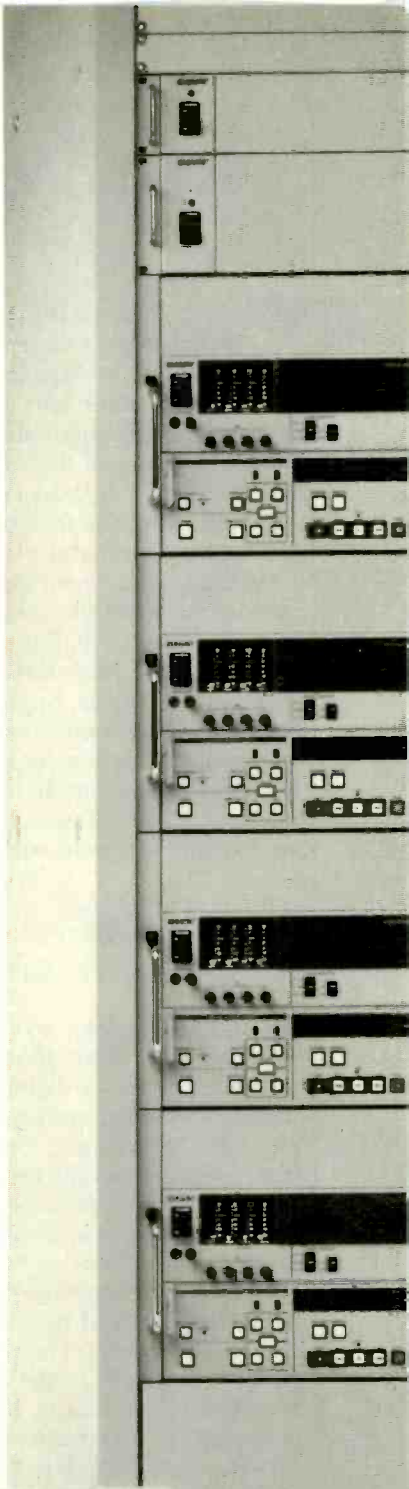

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Radio/Audio Studios: A Digital Future?

Every discussion, it seems, whether it's centered on radio or production studios, turns around to confront digital technology. Though there are many proponents of the various high-quality analog systems, everyone is looking toward the inevitable pervasiveness of the digital plant.

As discovered in our Radio Studio focus group, highlighted by comments from Tom McGinley, Engineering Director of Cook Inlet Radio Partners and Lindy Williams, Engineering VP from Lotus Communication Corp., analog consoles are accepted as exceeding specification, but digital can help in almost all other areas. The moderator was Tim Wetmore, editor of *BME*.

"This is mass technology that's being used in the computer industry where we've got 5 million machines to draw from."

——WILLIAMS

BME: Let's talk about digital audio in the studio.

WILLIAMS: The system from CompuSonics looks like the most promising thing in digital. I'm sure there will be other competitors in this area. But, right now, CompuSonics has a record/play unit for $6,000. It's the same price as cart equipment and what you've got is a full-quality digital storage medium, in terms of signal, noise and distortion figures, and cartridges that will hold up to seven and a half minutes. The $20-$25 cost for the cartridges is the only factor you have to add into it; but you will never find a conventional broadcast cart that's going to last 2,000 plays.

BME: Does digital even out—would it balance in terms of cost/longevity?

McGINLEY: The cost has to come down.

WILLIAMS: You have to remember that you're getting a dramatically improved performance and also realiability. These machines have virtually no downtime. There are a couple of stations that have used them for almost a year, I talked to the engineers, and they said nothing ever went wrong. You plug it in, you press the button, they are always there.

McGINLEY: What about editing?

WILLIAMS: You can sit there with a Macintosh interface, you put it up on the screen, and you can edit tighter than with anything analog.

BME: So is the implication that this is the beginning—we're going towards digital audio completely and everybody wants it.

WILLIAMS: I was going to make some analog cart machine expenditures. I am now hedging and pulling back. I can't put another nickel into analog carts.

BME: It's that typical dilemma, how long do you wait for the technology?

WILLIAMS: I'm not waiting too much longer, I think the price of these new plug-in digital carts is going to come down to the same price as analog carts within three or four years.

The reason is not because of our industry. This is mass technology that's being used in the computer industry, where we've got 5 million machines.

McGINLEY: The volume is bigger and we don't have to pay for it..

WILLIAMS: There's a parallel in CDs; you can buy a CD player for $100 now.

McGINLEY: CDs are liable to be dead, eventually. Look at the reliability problems that we didn't anticipate. The hard disk medium is probably going to supercede everything else as it develops. People will start buying it and using it—I know engineers now that will not make any more committments to CD because of the problems, the cost and the perception that it's going to be short-lived.

BME: Then the question is, if you've got this hard disk format, how does the programming get to you? You're going to have to dub from your current libraries.

WILLIAMS: That doesn't cause the problems in terms of the archive library you've got sitting in your station. Pull it off the supplied programming and make your dub.

BME: As far as the studio developing, what is it going to take in terms of time and technology to give you a general, digital studio?

WILLIAMS: I don't think we want to go all digital.

McGINLEY: Certainly not now—even in the next year or two. There are digital console problems, cost being the most important. Have you seen some of these all-digital editing stations like the New England Digital 'tapeless studio.' It's $100,000. That is just out of our realm.

WILLIAMS: I think we put a little bit too much emphasis on editing. Our production people don't spend that much time editing, and out of the seven or eight multitrack studios we

If costs can be brought down, engineers are ready to adopt digital production systems into both studios and control rooms.

have, I've got two or three people in the company who know how to work with multitrack...

McGINLEY: ...and do it creatively.

WILLIAMS: So we're kidding ourselves. Most of the time you still take the copy, slap on a record, and read the copy over the bed.

BME: Should we be moving away from that?

WILLIAMS: Yes and no. I'd say that where you're going to see the creativity come in is where the people get paid for it. But not at most radio stations. Even in large radio markets they do very little in-house.

McGINLEY: That's not entirely true. I think the larger the market size the more creative people there are, and the more talent you will find in the production area. Those people will use this technology as it becomes available and they become skilled with it. But they've got to learn these techniques. Our guys, a lot of them, are still snipping and gluing with splicing blocks. Because they're used to it.

BME: Why isn't the NED workstation more valuable to you?

McGINLEY: It's just not cost-efficient right now. Production houses and recording studios are using it. But it's not going to filter down into the radio arena until that cost comes down significantly.

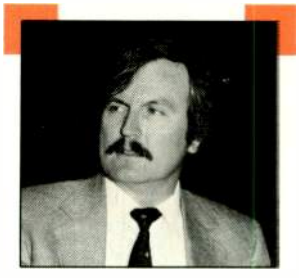
WILLIAMS: We have creative people out there and I feel that it is a real edge for the stations. We don't make our living being creative in the production studio as much as we do on the air with commercials. But it's the other ingredients that set it apart.

BME: Is part of that flavor what is available to you in technology?

WILLIAMS: Creativity and technology have to work hand-in-hand. Most creative people are not generally adept in working with the technology.

McGINLEY: Some are trained, but they're hard to find. We're looking for those kinds of people.

WILLIAMS: I still feel that making a quality, reliable digital system for the control room is where the emphasis should go. I don't say to ignore production—the technology is there, and it's useful. But you can stick these digital disks in the control room and the cigarette smoke is not going to bother them like it does the CDs. You can interface with some of the music rotation systems, actually program all your record library.



"CDs are liable to be dead eventually....The hard disk medium is probably going to supercede everything else as it develops."

—McGINLEY

McGINLEY: That's good and bad, though. Because computerized rotation has its problems too. It has to be overridden from time to time.

WILLIAMS: You lose the ability of the jock to relate to his job.

McGINLEY: And I don't think we can do that in radio. Right now most stations are using computerized music rotation systems so the jocks don't pick their favorites over others. The problem is that you've got so many different possible categories and subcategories of that you can assign to a given song. So the cross-mixes from one song to the next don't always work. Therefore the jock has to have some ability to override that.

BME: Should it be easy to override these systems?

McGINLEY: The jock's going to have to program or he's going to have to access the total menu. He's going to have to become keyboard-adept. In part, it's the operator interface that's causing the problem.

BME: Isn't that true with any kind of transitional procedure?

WILLIAMS: It's hard for the people to relate to, especially since most of the jocks in your major markets have been in this business for a while.

It's not going to be something that they're just going to pick up on.

BME: No, of course not. But that's the question; is it worth it, to get this new technology into the studio and go through the pain of having them relearn?
McGINLEY: It will have to be.
WILLIAMS: Going back to the software rotation, if they build software that would provide a dual log, and give you some alternates so that the jock could make a selective choice—still within a rotation scheme but based on his mood and the feel of the music, that would be ideal. We've got a whole computer that just sits there churning the stuff out. But, if they could provide something that gave them a playlist that also had the alternatives so you could take A or B; and then what they'd have to do is reconcile the log at the end of the day showing what they should play so that the log would then update.
McGINLEY: It would take more memory, but I agree. It should be done. Too many stations are too rigid.

BME: Well, again we keep going back to computer or digital kinds of solutions to the problems and we always come up with a problem there too.
McGINLEY: It's retraining and cost.
WILLIAMS: It doesn't have to be. Going back to the hard disk we discussed before, it's the same size cartridge as a CD package, in a very small case. And you can hold them in a CD rack. The technology hasn't changed in terms of the jock because he grabs the disk, sticks it into the machine, and for all intents and purposes it's a cart machine. And it's magnetic, not optical, so you don't have the gumming- up problems; it's got every plus that I can see at this point and very few minuses. The only minus is an increase in cost.

As far as consoles, I would not change to a digital console.
BME: Why not?
WILLIAMS: You've got cost effective units now and the console is not the weak link. When you're talking about cart machines, that's the weak link. The number one thing that the engineer does in a radio station is maintain cart machines.
BME: It seems that if you say that consoles are not a problem, that's because you are very careful in the consoles you buy.
McGINLEY: The mechanics are the big things. The performance you can get out of a Chevrolet versus a Cadillac is not all that different.
WILLIAMS: They all use the same chips. They all use 5532s. It's a standard chip; you can get 95 to 105 dB S/N with these things.
McGINLEY: And you'll never measure the distortion with conventional test equipment.
WILLIAMS: It's as good as the digital delivery system will provide.
McGINLEY: It's just the mechanical switches and sliders and, by the way, analog consoles are better than digital in S/N.
WILLIAMS: Not only that, their flexibility, in terms of some other control aspects, is equal to or better than what's available in digital boards, and the digital features are cost prohibitive. It makes no sense.

"I was going to make some analog cart machine expenditures. I am now hedging and pulling back."

—WILLIAMS

"The mechanics are the big things. A Chevy isn't all that different from a Cadillac."

—McGINLEY

BME: What else in the studio needs to be improved?
McGINLEY: Reel-to-reel machines.
WILLIAMS: I made a decision five or six years ago that I don't buy high-end reel-to-reel machines. The technology is not going to be around that much longer. Manufacturers say their machines will last 10-15 years. But in 10-15 years, I won't want to use them.
McGINLEY: The life cycle of machines, certainly with digital coming in, may increase. I think you track this technology out no longer than 5-7 years; the CPAs will depreciate it.

We buy high-end because of the demands of the major markets. We're trying to attract people, leading people, that are used to working with the finest equipment. We can't bring in a guy in Boston, for example, who has got 5-10 years in the business and expect him to be happy with an outdated two-track machine.

BME: So, do you tend to buy certain brands?
McGINLEY: My own preference in open- reel analog is Otari. But Studer is rapidly becoming a close second. They've really come in strong with their recent product line in both two-track and multitrack.
BME: You say you usually go in with high-end. Have you got any digital reel-to-reels?
McGINLEY: No. The cost is still way to prohibitive. They're $20,000-

$30,000 just for openers.

WILLIAMS: In a different technology than he's talking about, we've got three Sony video PCM systems. It's full digital record/playback capability. For the recording of classical music feeds off satellite it's extremely practical.

McGINLEY: Don't you think R-DAT would replace that?

WILLIAMS: There are no advantages for us with the R-DAT. We have to buy the more expensive user-specific cartridges. The cost of the machine is much higher and we've already got PCM digital in place.

McGINLEY: How much money do you have in that?

WILLIAMS: If you buy a Sony Betamax it's about $400, and a PCM encoder/decoder unit is about $1000. So you can pay less than $1,500 for a digital record/playback system.

McGINLEY: For long show tape delay applications, I agree, that's a very economical way to do it.

WILLIAMS: The cartridge is a consumer item which has brought the price way down to $3-$5 a cartridge. You get 20 to 25 plays, you throw it away because the dropout will come and get you by the 30th play. But even so, it's there, it gives us the performance we want cost effectively. Yet, it's kind of interesting, when you get all of this together, you ultimately end up putting it on what?

BME: A cartridge.

WILLIAMS: And, when you get done, you've got a 55 dB S/N.

McGINLEY: Maybe 60 dB.

WILLIAMS: On a good day. But it's ultimately what it's reduced to. There are tradeoffs, and the cost verses the return is where you pay a tremendous price for a small improvement.

McGINLEY: That's true, for most broadcasters, you do. ■

NEW IDEAS IN VIDEO RECORDING TECHNOLOGY

Video Recording and Acquisition: Digital Captures the Spotlight

As the D-2 digital star rose over the the NAB show floor, the engineers on our panel on video recording technologies united in predicting the eclipse of Type C. They saw D-1 component digital as having an assured but limited place in the post-production environment, where its super high-quality may outweigh its super high pricetag. But their reaction to composite D-2 was enthusiastic. With D-2 covering the high end and half-inch component analog a reliable medium for field acquisition, one-inch is squeezed in the middle. "I'll never buy another one-inch recorder again," vowed one engineer.

Other video recording technologies also came up in this wide-ranging discussion. The benefits and limitations of magnetic and optical disk recorders, and also of the new RAM-based solid state recorders, greatly interested our participants. And yet they agreed that ¾-inch U-matic will be around for the long haul. The bottom line, they said, is doing a high-quality job at a reasonable cost.

Joining *BME* for this discussion were Jim Bartell, chief engineer of Post Effects in Chicago; Bill Napier, director of engineering for Jefferson Pilot Communications in Charlotte, NC; and Jeff Bettis, director of engineering for Grace & Wild in Detroit.

BME: One of the hot stories at this show is the introduction of studio recorders in the D-2 composite digital format. What's your response to D-2?

BARTELL: We think D-2 is going to be the next step for videotape recording. A lot of it is market-driven from our end of things. Our clients want to see cleaner-looking video. They want to be able to do 20 or 30 layers of video effects and retain first- or second-generation image quality. That is something D-2 can offer without breaking the bank and without having to turn part of our facility over to component signals.

NAPIER: I've had a chance to see the D-2 machine, and I'm very impressed with it. The fact that it will go 20 generations and integrate in an existing plant is the key element. Compatibility with existing plants is no small matter. Post facilities can maybe deal with the concept of component distribution and switching, but the vast majority of these machines more than likely will have to be integrated into facilities that can't deal with that. Ampex has done a nice job of tying it in with the VPR-3 Zeus. The concept has been well thought through. The fact that we can carry a cartridge from the Ampex booth to the Sony booth is very, very encouraging. The first question I had to Sony is, "How many can I have?"

BETTIS: We'll never buy any more Type C machines, that's for sure. We had an opportunity to use a couple of D-1 machines early on, but when they finally became a reality, we had no real use for them. We couldn't justify the cost increase, the machine time increase, the tape stock. It seems like there is a cost consciousness that's happening these days. The industry is going two ways, and C is stuck right in the middle. Digital, and especially D-2, is going to take us to the high end, and the Beta SP and MII are going to take virtual C quality to the economy end.

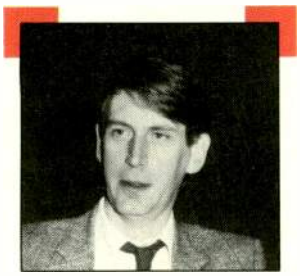
BARTELL: You brought up a point that is so valid. Advertisers don't want to pay any more for what they're getting right now, and it puts people in post-production, especially, in a bind. You have to be very cautious now as far as where you are spending your money. There is a lot to chose from, and there is a big gap growing right now between the inexpensive devices that can do the same for half the price, and, on the high end, something like a Harry, which to get involved, you're talking about a million dollars. You can certainly blow your entire year's budget on one device, and you've got to make sure that's the right device. With that in mind, I think D-1 is a wonderful format for

The D-2 revolution was foremost in engineers' minds at NAB '88.

graphics work, but it is not in any way capable of replacing one-inch machines.

BME: Is that because of the connectivity issue or is that for operational reasons?

BARTELL: Some of it is operational. One thing that on the surface would seem trite is that the D-1 machine can't do dynamic tracking or AST. But I can plug a D-2 machine right into a system right now and get immediate results without having to go that analog tape generation. With D-1, I've got to either spend a lot of money in com-



"We'll never buy any more Type C machines, that's for sure."

——BETTIS

ponent processing, or kind of just throw out the window all the benefits of keeping it that way by combining the signal into a composite form. It just doesn't make any sense.

NAPIER: I've got some 10-year-old one-inch Sony machines that were Type B machines, upgraded to Type C, and those sweethearts are just sitting there grinding out edits all day long. What we paid for them, I couldn't hardly buy a Beta SP machine for today. But for multigeneration work you've got to go to a Zeus. D-2 makes it possible to go to a Zeus without paying as many dollars. And if you want to almost be factious, you can pull your BVU-800s out and slide a D-2 machine in their place, and the installation time is probably going to be about an hour, 50 minutes of which is trying to get the rack rails to line up exactly. D-2 is an affordable alternative to one-inch.

BME: What about the tape costs for D-2?

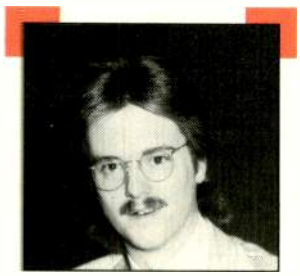
BETTIS: I don't know the exact figures, but that is going to be a problem, at least initially. But that's got to improve. We were real early in C format, too, and the tape was terrible back then. I just dread going through this whole education process again. I hope that the manufacturers learned a little bit from C and know what we need. Although the digital formats are less tape dependent—the error correction is so robust and the equipment is so much better. But still, the cost is going to have to come down.

NAPIER: You may remember, even as soon as last year, nobody could tell us what Beta SP tape would cost. And you could buy from Panasonic MII tape at a reasonable cost versus what some were saying it was going to cost. I won't say those prices have plummeted, but they certainly have come down to a manageable number. I think the point of it is, if we're going to have the D-2 machines, then the D-2 tape is going to be available at comparable prices.

BME: Do you see D-2 encroaching on the potential market for D-1?

NAPIER: I don't believe Sony or Ampex or whomever really cares what model number they sell. They need to sell units that meet a specific need. And if the D-2 machines meet that need, that's what they'll sell. I think we all agree we really don't care how you put it on the tape, as long as it goes on the tape good and comes back off good.

BARTELL: I think that there always will be a market for both machines. But again, as in most things in our business these days, it's market-driven. I've got a need for one D-1 machine. I don't have a need for five of them. But I do have a need for 12 D-2 machines. I think a lot of the negative feelings on D-2 in the beginning were just from its unfamiliarity. Now, almost everybody who really under-



"I've got a need for one D-1 machine. I don't have a need for five of them. But I do have a need for 12 D-2 machines."

——BARTELL

stands both formats is supportive of D-2, and I don't think there's any issue of D-2 threatening D-1. They can coexist.

BME: How do the D-2 machines stack up from an operational point of view?

BARTELL: The machine that we had, I used it for a few weeks without reading the instruction manual. The Sony D-2 machine is very intuitive. It breaks the operation of the machine down into menus, and if there are setups that aren't used most of the times, there are little sub-menus behind them. It really is a wonderful machine control system.

NAPIER: Operationally you could take one of these machines tomorrow and put it in anybody's house and hand them a two-page manual and

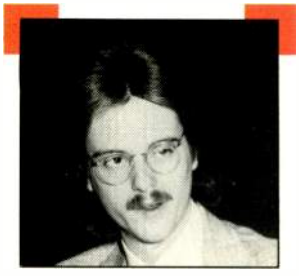
they could be using it effectively.

BARTELL: It even responds as you would expect any previous one-inch machine. You don't get any digital funniness that you're not used to. There isn't anything to relearn in an edit session.

NAPIER: And you can SCH phase the machine without any problems. The only thing that has changed is the recording format; it just happens to be another way of putting it onto a piece of videotape.

BETTIS: Harry owners are the ones that need D-1 machines, really. If it wasn't for Harry, I'm not sure Sony would be selling too many of those D-1s. Do you use your D-1 on a Harry?

BARTELL: We've had a D-1 now for about a month. And we'll probably be



"No one format solves everybody's problems. Physics doesn't work that way."

—BARTELL

looking at either the Harry or the A64. We chose to go the composite digital route with the A62 and just because it offered us some things that the Harry didn't have. The Harry is a wonderful product and from an operational point of view. It's just an elegant interface for the user. But there are a lot of things that it didn't do.

BME: Let's move on to other kinds of digital recording, such as disk recorders and the new RAM-based recorders from NEC and Sony. Have you seen these? How do they fit in with your operations?

BETTIS: Ten years ago it was always a big joke to say oh, they are going to have a tape recorder on a chip. Well, they've done it. I don't think they will be able to extend the time to anything practical in the near term. Sony says their RAM recorder is for sports applications; you can record three cameras at once on it.

On the other hand, disk technology is just becoming amazing. Every six months it just takes great leaps forward.

NAPIER: The CMX 600 may finally become a reality. Memorex and CBS came up with the concept of disk-based editing in the early '70s, but we didn't have the technology to build it. When you can finally have a disk recorder that doesn't crash heads and the like, that's going to be wonderful.

BARTELL: The RAM system is interesting, but it's a novelty now. But it's one of those novelties that I think is going to fuel the next generation of television recording. From an engineering point of view, it seems very sensible that the last weak link in the system is the tape. Now we've gone from recording analog signals on a tape to digital, and that's great; we've increased quality 10-20 fold. The next step is to get rid of the tape totally.

BME: What about optical media? What's happening there?

BETTIS: The magneto-optical type seems to be something that could really work, although it's not practical yet. Sony is showing this wonderful still store system in their technology exhibit that uses a huge cassette changer-type juke box disk, a 4:2:2 disk recorder player system. It downloads to hard disk workstations, and that's great for still-storage. They're saying that should be a product next year.

NAPIER: The real advantage to an optical system is that they never wear out. That's probably the only reason to move towards that media, unless of course there is a considerable cost savings. It goes back to the same thing. There are a lot of things that would be wonderfully elegant to do, but can we afford to do them?

BARTELL: We need systems from manufacturers that can do the job. We don't have the time any more to play around for a year to two years,

"I think we all agree we really don't care how you put it on the tape, as long as it goes on the tape good and comes back off good."

—NAPIER

putting something through its paces, only to find out that now we've got to replace it. I think the industry has really learned a lesson concerning up-front quality.

BME: Let's talk about small-format recording, specifically the new half-inch formats, Betacam SP and MII. What are their strengths and weaknesses for your particular operation?

NAPIER: In the sports area, our chief engineer is going to be putting SP on the truck, and to use for slow motion as well. We're shooting SP in our news operation, but currently we're shooting regular Beta tape in

'IS MUSIC TO OUR EARS AND EYES.'

Any way you look at it, this was no easy assignment for National Video Center Recording Studios: two nights of Carly Simon in concert had to be edited down to a one-hour HBO special. The schedule was tight; there was no room for error. That's why EASTMAN EVT-2000 Broadcast Video Tape was chosen for this assignment by senior colorist Bill Willig and editor Chris Hengeveld.

Bill: "The hard part was matching colors. The concert was filmed at dusk, with big arc lights for keys. And we had lots of reds, the toughest color in video. But our Eastman tape held up fine. Actually, we went to four generations with this tape. Film transfer, editing, master, then dubbing. The quality was amazing. A technical person might see the generation differences. But you couldn't see it on the broadcast."

Chris: "Some tapes have tremendous dropouts. Especially saturated color. But when we use Eastman tape for a job, we never have those problems. Our clients love the color."

Bill: "We were really pushing to get it done. HBO was running promos, and actually had it in the program guide before it was shot. That kind of schedule called for Eastman tape reliability."

Chris: "We've been using it for two years for a lot of different jobs. It's one of the many tapes we use that's never let us down. We trust it."

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Senior colorist Bill Willig (left) and editor Chris Hengeveld.

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the SP machine. We're shooting all of our EFP commercial work on SP, and candidly, there was a lot of concern from those in-house that this isn't one-inch. The end result is that in first-generation transfer to one-inch, we can't tell the difference. We've been using regular Beta as a commercial delivery system since April of 1985. It has done an outstanding job for us. Our error rate with the Beta system is on the verge of phenominal. We just don't lose playback in a Betacart. The system is very robust. But we do not consider half-inch to be a replacement for one-inch. Those who feel MII can be universal format, I think are simply mistaken, or at least that's their story and they are sticking to it.

BARTELL: That's very true. There is no one format that solves everybody's problems. Physics doesn't work that way. There are certain technical things that half-inch cannot do because of the limitations of the medium. I think half-inch has a wonderful place in the current marketplace as an acquisition format.

NAPIER: This may be heresy to say, because we've been talking about all these high-end formats, but in first generation, ¾-inch SP BBU-950's and 850's don't make a half bad picture, to put it mildly, for what those machines cost.

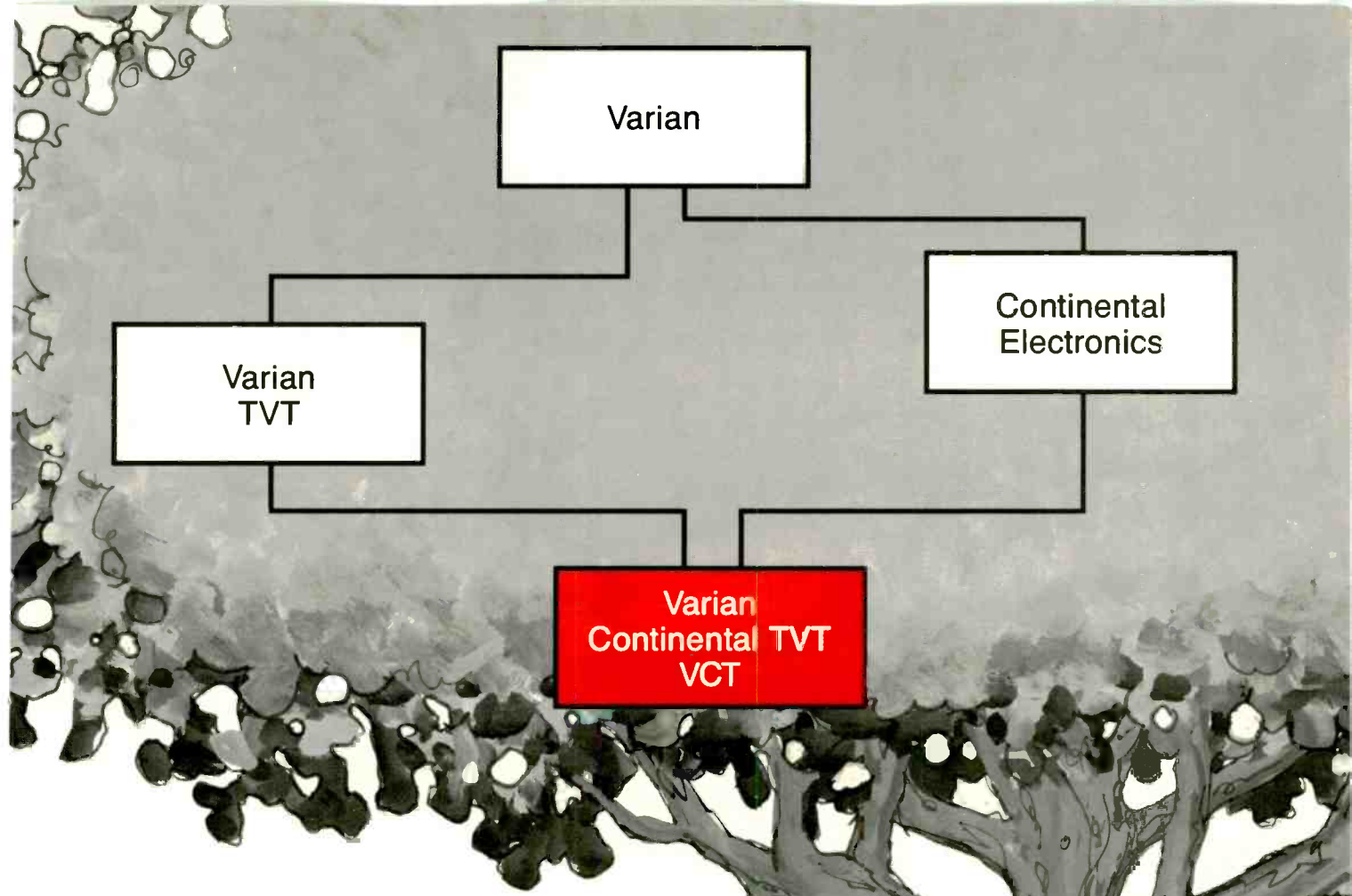
BETTIS: It's amazing how far the U-matic format has come.

BME: U-matic has been a proven workhorse for many years now. What's your view of the future of U-matic?

NAPIER: I think three-quarter is entrenched in the broadcast industry probably deeper than one-inch, believe it or not. We're going to maintain three-quarter capabilities for the forseeable future. I trip across, believe or not, 60 ¾-inch machines around my plant in one form or another; those aren't going away next Thursday.

BME: Aside from the very significant introduction of U-matic SP, aren't manufacturers pulling away from U-matic?

NAPIER: Sony has moved it into their industrial distributors and the



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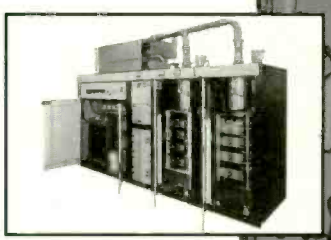

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broadcast people at Sony are no longer selling any three-quarter directly. But they're still developing the equipment. They came out with a brand-new full line of three-quarter equipment that is smaller, lighter, better performance and cheaper. Where do I sign? Seriously, they've got the 950 and they are bringing out the 970, which will be the dynamic tracking version of that. The folks who keep telling me that three-quarter SP will never amount to anything may be right, but Sony keeps building more u-matic machines and keeps selling them.

BME: Where do ¾-inch and half-inch formats fit into the post-production environment?

BETTIS: We are using original Betacam as an acquisition format. In our market, it's virtually replaced 16 mm film in the field. We do a lot of industrials and the producers love the Betacam.

BARTELL: We've seen that in our location services department, which rents out Betacam and one-inch portable gear. Two years ago, one-inch was dominant. Everybody was doing one-inch in the field. Now it's just totally reversed. 90 percent of the packages that go out, go out with Betacam. We'll be getting SP this year.

BME: This discussion seems to spell a death knell for one-inch tape.

NAPIER: Eventually, maybe. But we've still got six quadruplex video tape recorders in house. One of them was used to demonstrate Editec at the NAB in the '60s. It still works, and probably will until those of us who know how to fix it either get killed or die. The new operators look at it and say, "What's that?" That's a real video tape recorder. But look at all the stuff sitting on the shelves on a one-inch tape. It will be around for a long time.

BARTELL: I think in post-production, if you take a look at how one-inch replaced quad, it was kind of a slow, universal progress. I think this time we're going to see a very rapid changeover.■

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Digital Imaging: High

When it comes to graphics and effects, teleproduction and broadcast engineers are savvy pragmatists with a sharp eye for market trends. Our discussion on digital video imaging produced some pointed comments about the need for quality, power and streamlined user interfaces.

Our panelists saw great promise in the new integrated graphics and effects packages as newer models tempered their initial skepticism. Developments in high-res character generation also heartened them. But they won't be ready to go all-digital until the quality of all the elements surpasses what's now available in the analog domain.

Joining us for the discussion were Herb Ohlandt, chief engineer of National Video Center, New York; Pat Howley, president and chief engineer of Post Perfect, New York; and Fred Hoffman, chief engineer of KIII-TV, Corpus Christi. *BME* senior editor Eva Blinder moderated.

BME: One thing we've been seeing for the last year or two is a trend toward integration of capabilities into a single device. What do you think?

HOWLEY: Before the show, I was a skeptic about combining different devices in one box. But after seeing the DF/X, I'm starting to come around. They've got people that have demonstrated that they can build the individual boxes elsewhere and put them all together, and that box just may work out and be one of the first truly integrated paint/character generator/effects devices. At first glance, it looked pretty powerful.

In the world of graphics and effects, cost counts, but only when balanced by power and profit potential.

BME: What about it changed your opinion?

HOWLEY: The quality of the paint software, the quality of the digital effects, the fact that the digital effects can be talked to by Wavefront. They did a lot a research. I've seen combo boxes before that weren't quite as good.

HOFFMAN: From our point of view, as a small-market broadcast station, our main graphics concerns are how we can help our advertisers do a good job of production within our facility. We're looking very strongly at the Ampex ESS-3 because it combines a bit of cut and paste, enough to do news and production, and it also gives you the still store which we need for the news operation. Plus, for weather graphics we need a combination device which will allow us to upgrade our on-air look and also do a good amount of rotoscopic and 3D work. We're looking very closely at the Color-Graphics ArtStar because it does cover all of those needs in one box.

HOWLEY: Another reason the DF/X is so attractive is the price. A dual-channel device is less than what we typically paid for a single-channel effects device a year ago.

OHLANDT: I'm also very impressed with the DF/X 200. The most frustrating thing about our operation in the last two years has been the difficulty of tying the Paintbox artist to our Alias animator to our editors, and compositing something in a total package. No amount of training seems to marry these people in a fast, efficient, effective manner. Even though they're very cooperative and they want to learn, it just doesn't hap-

;nd Meets Bottom Line

pen, at least at a pace that I'm happy with. So I have been encouraging devices such as the DF/X 200.

BME: Have you seen any of the other integrated systems, such as the one from Pinnacle?
OHLANDT: Pinnacle has done a real good job. The only real problem is, I'm based in the New York marketplace. And I don't think the New York marketplace is going to buy Pinnacle.
HOWLEY: Several buzzwords you have to have. And it's typically the CMXs, the ADOs, Kaleidoscopes, Chyron. DF/X will probably become a buzzword. I know people that are successful substituting various devices, but only in a certain market niche.

"I don't terribly care what the price of the equipment is. I care that it does the job."

——OHLANDT

BME: Another answer to the same problem is interconnecting different devices with a similar operator interface, such as Quantel with its bit pad interface. Have you seen that?
HOWLEY: Yes, we ordered it. Operator training is a big issue. A unified user interface, such as the Harry control panel, increases the speed. The Harry approach, in general, is very user-friendly.

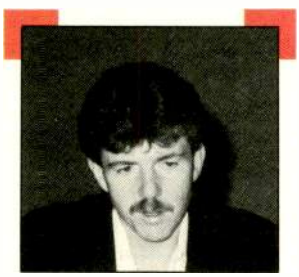
BME: It seems that menu-based systems are becoming very popular. Do you think that that's the way the industry is going?

"If we spend $100,000 on a paint system, the company that's building it better be there five years from now."

——HOFFMAN

HOFFMAN: They've got to become more user-friendly. The menu- driven interface eases the operation. In our situation, we have one person that is responsible for all our graphics, character generation and everything. And making sure that person can rapidly throughput all the stuff that we need is critical.
HOWLEY: We notice there is usually a tradeoff between user-friendliness and power. But something like a Quantel Harry or Paintbox strikes a good balance. I've seen some very user-friendly devices that any bozo can operate, but try to do something tough on it, and it takes you forever. Manufacturers that hit that midpoint usually have a good product.
OHLANDT: I don't think there needs to be a tradeoff. From the point of view of hardware and software power available today, the most complex anything can be done with one keystroke; by the same token, you can do it with 1000. It's a question of manufacturers taking the time and making the effort to bridge the user interface to the power that is behind it.
HOFFMAN: A lot of that has to do with software/hardware mix that the companies are using. That all comes into play as to how user-friendly the machine can be, and do the processing and the throughput in a reasonable amount of time.

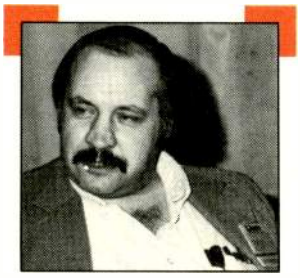
BME: The lower-priced graphics systems are now demonstrating capabilities that were once strictly the province of very high-end systems. Where do you draw the line between high-end and low-end systems?
OHLANDT: As far as I'm concerned, I don't terribly care what the price of the equipment is. I care that it does the job very well and very efficiently. Certainly in the New York market there is a large dollar commitment to capital. But the dollar commitment for the personnel to operate it is a far bigger number. So I don't terribly care whether it's a $50,000 item or a $250,000 item. If the job gets done 10 times faster, the cheaper device is the $250,000 item.
HOFFMAN: Cost is very important to us because we have other things tugging at us. We've got RF plants to maintain, to get the signal out; we've got studio production, we've got news, ENG the whole nine yards. As far as the differences between the low-end



"Some of the worst demo tapes I've seen recently are the ones that are coming out of the all-digital studios."

——HOWLEY

or the high-end systems, from what I'm seeing, the big difference is how long does it take to render a 3D on the lower-end systems. The end result looks pretty much the same.



"We're going to continue to grow in the use of digital, but I don't see any reason to say I've got to have an all-digital plant."

——OHLANDT

HOWLEY: If someone dropped off the face of the earth three years ago, and came back today and walked around the floor, they would be hard-pressed to tell which were high-end systems and which were low-end systems, by the first look. On further analysis, there's still a difference. How long it took, how much more you can go beyond that, is that company going to be around five years from now if you buy it—those are all separate issues. But if you just look at the monitors, everybody has got 3D letters with tremendous textures and great motion.

HOFFMAN: When we look at a piece of equipment, we need to know that the manufacturer is still going to be around. I guess the perfect example of this is RCA. Everybody thought that RCA would be here when the second ice age hit. And all of a sudden boom, no more RCA. So if we jump in and spend $100,000 on a paint system, the company that's building it damn well better be there five years from now to support that thing for us.

HOWLEY: We have a list of criteria that we use in evaluating 3D systems that was developed by Dean Winkler. The weighting scale changes year by year, but user support is always very important. If it breaks down at twelve midnight, can you get service? When you apply those criteria, you can shake out most of the systems that are too slow, too ineffective.

BME: Are there any interesting developments in character generation?

HOWLEY: I think the Abekas A72 is a major breakthrough. The real-time font resizing has shaken a lot of people up in the other camps. I currently own two Scribes, and I've got to take a good hard look at what I buy as a third character generator. It's tough when you buy one and then someone else leapfrogs. We're taking a good hard look at both systems at this NAB and the jury isn't in yet.

OHLANDT: Again, I think in the character generator area if there is hit of the show, it's clearly the 72. It's not all the way there yet, but I smell a winner. I have four Aston 4s and they're also speeding up, adding enhancements and additions.

HOWLEY: Fred, the older character generators were faster and had a drop shadow built in. The new series of character generators have high res, but some of the features that you learn to love in the older units aren't there. How does your station feel about it? Is high res important or is the speed more important?

HOFFMAN: Speed is very important to us. I'll give you a good for instance. Our first newscast goes on the air at 5:00, and do not stand in the hall at the tape control at two minutes after five because you're going to get stomped to death. The tape editor is bringing the story in to throw it in the machine and the director is in there screaming and panicking and the producer is passed out on the floor; and this poor gal is sitting over here at the Vidifont character generator trying to type in some news graphic. Speed is very, very critical.

BME: What about the field of digital video effects? Have you seen anything exciting and new?

OHLANDT: I think that this is not the year for revolutionary digital video effects. I think that next year will be.

HOFFMAN: The old phrase caveat emptor always comes to mind. Look back at what NEC did seven or eight years ago when it came out with mosaics. My god, that was a digital effect! and the audience and the clients tired of it that quick. Now, you've got to continue to become more innovative in what you can do. You've got to know what box you buy to keep your client happy and how fast do they tire of it.

HOWLEY: It's probably the most overused music video effect right now. Although when it's done well, it looks great.

HOFFMAN: Exactly. You also see a lot of this color on black and white effect. How long will that be considered a creative, innovative idea before you have to go on to something else? And how much did you spend for the box that does that?

HOWLEY: I agree. I think the more subtle uses of DVE are important, like softening matte edges and creating realistic shadows when you marry 2D- 3D film and video together.

"The rush to go all digital everywhere has been slowed down by the facts of life."

——OHLANDT

BME: Is the key quality of the current generation of devices up to

your expectations?

HOWLEY: I compare most devices to the Grass Valley 300 linear keyer because that's the thing we use most often. And there is room for improvement in most devices.

OHLANDT: If I had my druthers, I'd like every keyer in the world to be an Ultimatte 5. But that's not realistic in 1988.

BME: What about interconnecting all the different digital boxes? How do you feel the industry is dealing with the situation right now?

HOWLEY: We've tackled some of this by having custom boxes made. Bob Lund made a digital video converter to interconnect our Kaleidoscope with our Quantel Harry and Paintbox. It was a struggle, but we needed that custom box. I think you are starting to see some of the major manufacturers now making the converters for the various digital formats. We all started out with NTSC routing switchers, now we've got NTSC, we've got RGB sync, sometimes key routing switchers and D-1 routing switchers and maybe a routing switcher that is half D-1 and half D-2. It's getting harder to interconnect the plant these days.

BME: How close are we to the all-digital studio, and what are its advantages and disadvantages?

HOFFMAN: From the view of the small-market television station, we're not going to go out and scrap our whole studio facility to do an all-digital station any time in the near future. We will slowly add on pieces of equipment, but we're perfectly happy with what we get out of our Ampex one-inch machines right now. The ACR-225, for cartridge playback on the air, is a beautiful piece of equipment. It's going to make a big impact on the broadcast market. But where do you want to make the jumping-off point? The tape machines will have to be replaced as we go along, and the D-2 makes it a much easier transition than jumping from a standard VPR type machine to a D-2. The thing that I don't see right now is the equipment it would take to put it to air.

BME: Herb and Pat, do you want to

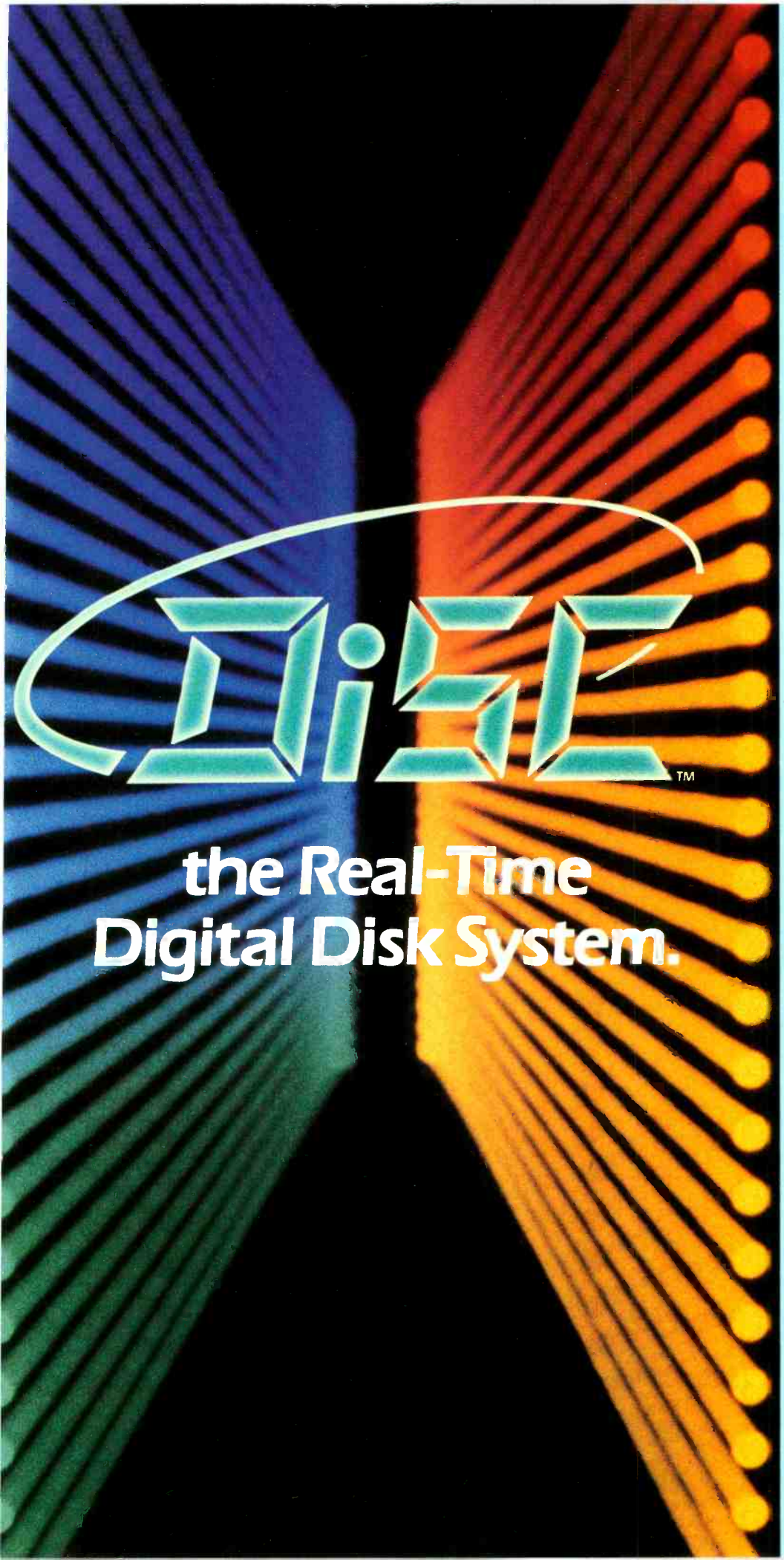
comment from the post-production viewpoint?

OHLANDT: The rush to go all digital everywhere has been slowed down by the facts of life. The quality and reliability of analog has climbed beyond what most would have expected. I mean, a 300 switcher is a device that sits there and works and works and works. It's heavily digitally controlled, but it is an analog switcher and it's just a beauty. So many other devices are a proper combination of digital and analog. Five years ago I was saying, give me a tape machine that's all digital, because I can't stand adjusting it. That doesn't happen with today's one-inch machines. They just keep working day after day and look very, very well. So, some of the great reasons to get into all digital immediately have dwindled. We're going to continue to grow in the use of digital, but I don't see any reason to say I've got to have an all-digital plant.

HOWLEY: I'd have to say some of the worst demo tapes I've seen recently are the ones that are coming out of the all-digital studios. The digital keys are not as good as the analog keys on a 300 switcher. Last SMPTE meeting someone showed a tape that was done in an all-digital studio and I couldn't believe it, it was that bad. And someone asked, why is the key terrible, and they said, well, it's a prototype digital keyer. The worst analog keys I've ever seen in my life looked better. I think they're pioneers and they're doing us all a service now, but they have a long way to go before the quality is as good as some of the things we can do with an A62 and a bunch of tape machines and a 300 switcher. I'm interested in an all-digital studio when it can do better quality than what I can do in my current one-inch rooms.■

"You see a lot of this color on black-and-white effect. How long will that be considered creative?"

——HOFFMAN



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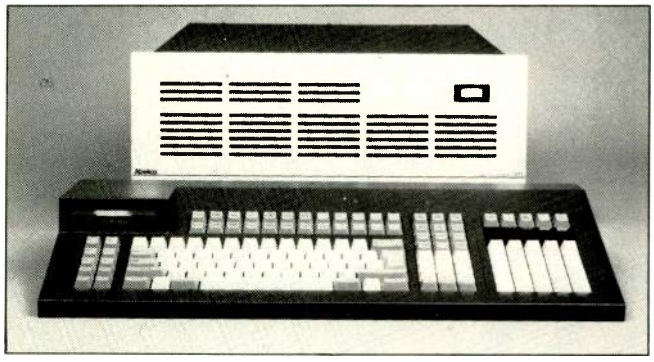
New Products From NAB

A compendium of new video, audio, RF and other products introduced or highlighted at the Las Vegas show. For more information on these products directly from the manufacturers, use the Reader Service Card bound elsewhere in this issue.



ABEKAS A72 FEATURES ANIMATION

Abekas showcased its new CCIR 601-compatible A72 Digital Character Generator. The design features character animation, instant font sizing, unlimited fonts and over 16 million colors considered on-line. A72 fonts are digitally derived from master typefaces used in the print industry. All attributes including size can be changed instantly. Full color RGB scan-in is also featured.
Reader Service #190

ACCOM INTROS DIGITAL NR

The Digital Image Enhancer 125 from Accom is a component digital video noise and film grain reduction system. It is designed to remove film grain during film-to-tape transfer and to improve picture quality by minimizing random video noise. It offers an all-digital 4:2:2 component signal system conforming to SMPTE/EBU/CCIR 601/RP 125 recommendations.
Reader Service #191

ACCU-WEATHER FRONT-DOOR V.3 DEBUTS

The Front Door 750 gives direct access to a large number of weather services. The package consists of data, graphics and imagery. Over 1200 images are available, including regional radars and satellites almanac, worst weather, temperature band maps, etc. The PC-based system interfaces with major graphics machines and allows display os the XT is equipped with an EGA card and monitor.
Reader Service #192

ACRODYNE SHOWS AIR-COOLED TRANSMITTER

Acrodyne's new FL Series of UHF TV transmitters feature high efficiency, high-performance tetrode visual final amplifiers and all solid state aural transmitters. They incorporate the company's field-proven visual and aural solid state amp modules, mounted in slide-out drawers. The 10 kW model, FL/10KU, is completely air-cooled and features CMOS-based tetrode control logic and a user-friendly status display panel.
Reader Service #193

ADAMS-SMITH SYNCS WITH NAB

The company's 2600 audio for video editor was on display with C:sound graphic audio editing. The system offered spotting effects to 0.1 frame accuracy. Also on hand were synchronizers and time code equipment.
Reader Service #194

ADC FEATURES ICON

A new family of products for terminating and cross-connecting audio cabling is available from ADC. The system uses QCP rapid, gas-tight termination. It allows for 22-, 24-, and 26-gauge cable with multiplying capability. The ICON is available in wall- or rack-mounted versions and provides for 192 terminations in two rack spaces.
Reader Service #195

AEROSPATIALE FLIES INTO VEGAS

Located in the outside exhibit area, Aerospatiale demonstrated the capabilities of the wide-body helicopter that specializes in ENG work.
Reader Service #196

A.F. ASSOCIATES WOWS ATTENDEES

The AFA booth was packed throughout the show, with people straining to see the EPO automated camera control display at the booth. Highlighted by an in-booth news set with anchorpersons, the setup demonstrated the zoom, focus and other camera functions as well as the remote tracking abilities of the system. The company's full range of other products was also on display.
Reader Service #197

AGFA ANNOUNCES NEW BETACAM TAPE

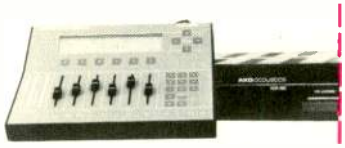
A new formulation for ENG and other broadcast applications of Betacam tape was introduced by Agfa-Gevaert. Known as Agfa Broadcast Pro Betacam, the tape was developed with the goals of higher S/N and operational stability. Features include low drop-out rates, and static and dust resistance. The box is compatible with available archive systems.
Reader Service #198

AKAI HAS PROFESSIONAL RECORDING

Akai brought its PCM 12-track recording system, composed of a deck section, locator section, and level meter section. It uses 8 mm VTR, audio follow video, and allows for master tape production for CDs with 16 bit linear quantization. 38-track recording is possible by synchronizing three of the decks. All controls are accessible and easy to use and the system is transportable.
Reader Service #199

AKG UPGRADES ADR

AKG, a relative newcomer to the world of digital reverb, has improved hardware and software for the ADR 68K to V4.00. It now has an expanded



memory to 1M words (32 seconds of 16-bit samples), new reverb programs, and expanded MIDI features. Sampling is greatly enhanced. The upgrade kit includes 16 1M DRAM chips, new EPROMs, and documentation. New MIDI features include parameter control, system automation, MMA sample dump standard, and sample storage in mono or stereo. New system features have audio input level and four analog control inputs mapped to control program parameters, factory presets expanded to 150, and help screens.
Reader Service #200

CART ALTERNATIVE FROM ALAMAR

Bent on being the"Cart Machine Alternative," Alamar introduced several products, including News-Cue. This deck control system makes on-air playback for news departments much easier. The VCR automatically rolls tape, identifies it, and cues the appropriate preroll, ready for a take from the director. It is priced at $14,995.
Reader Service #201

ALIAS INTROS 601 CAPABILITY

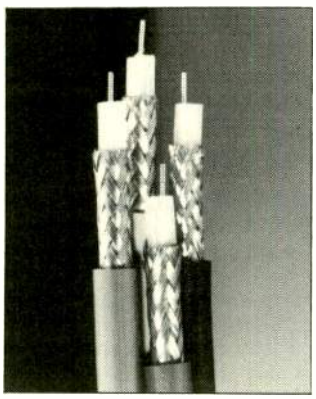
Digital component video compatibility (CCIR 601) on the Alias graphics system will be available in the second quarter. Alias will also offer direct digital integration with the new Abekas A-60 digital component frame store system. The Alias GT was also introduced as a upgrade to the Silicon Graphics 4D series workstations in conjunction with Alias/2 software for post-production. It offers real-time rendering to markets needing fast rendering.
Reader Service #202

THE BOSS COMES TO VEGAS

Alpha Audio automation systems has come out with a device that allows the user to control an unlimited number of tape transports, be they audio or audio-for-video, from the edit board. With The Boss, the user can manage 999 decisions and repeat sequences instantly. The Boss incorporates a"Boss Lock" that allows the machine to flow easily between automatic and manual control for off- and on-line editing. One key will yield a 48- track matrix on screen, allowing the user to select tracks easily.
Reader Service #203

ALPHA WIRE HAS NEW LINE

A new line of wire, cable and accessories for broadcast was introduced by Alpha. Video, au-



dio, microphone, data and coax for both indoor and outdoor are included.
Reader Service #204

ALTA BRINGS IN PICTORIS

The Alta Group has developed a video compression system offering composite and S-VHS inputs and outputs. The Pictoris is intended for anything from small production houses to networks, says Wayne Lee, Alta president. Selling for around $10,000, it can compress an image over live video, borders and mattes. It also has variable crop and position, four programmable presets, GPI remote control, auto zoom, and freeze. Delivery starts in September.
Reader Service #205

AMEK INTROS NEW CONTROL INTERFACE

New from Amek/TAC is the ESM1000 parallel and serial interface for the BCII range of broadcast consoles. The interface enables control from all major edit systems via Esam I or Esam II protocols.
Reader Service #206

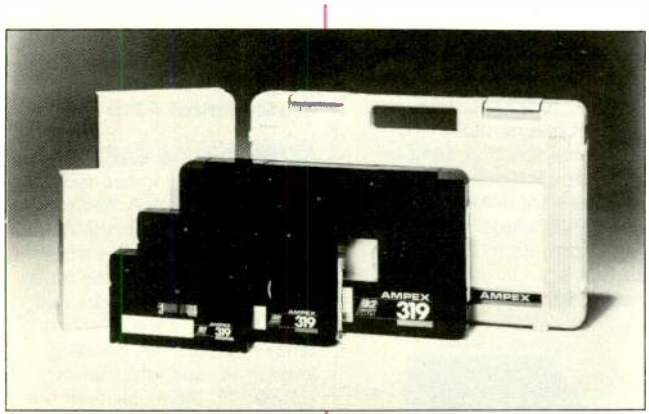
AMPEX HAS D-2 VTRS

Ampex introduced the VPR-300 series of D-2 digital studio VTRs for production, post-production and broadcast. Compatible with existing analog equipment, the unit delivers up to 20 generations with little visible loss. It also has four channels of digital audio. The new VTR provides the best of Type C quality with the convenience of cassettes.

Key features include status display, 20 ms playback lockup, precise field search and field-by-field jog, variable play speeds, automatic and manual Assemble, Animate, and Insert editing modes. A lower-cost version, the VPR-305, does not include automatic tracking capabilities. The 305 is easily upgraded. Also available for these machine is the new Zeus Port, an interface option for the Ampex Zues video processor. This will enable Type C tape to transfer to D-2.
Reader Service #207

NEW CAMERA FROM AMPEX

A new chip is employed in the Ampex CVC-7 to allow it to generate 700 lines of resolution. The high colorimetry system makes its images comparable to Plumbicon images. It can be used with a Betacam camcorder VTR, as a standalone, or as EFP or studio camera with multicore connections. The new electronic shutter allows clear pictures at high speeds. The line will roll out in the third quarter of '88.
Reader Service #208



AMPEX TAPE FOCUSES ON DIGITAL

D-2 was the buzzword in many areas of the convention, Ampex Tape being no exception. Its 319 D-2 tape is scheduled to deliver in September, coinciding with the availability of hardware. The composite digital videocassettes will come in three sizes—32, 90 and 208 min. The 319 employs a metal particle formula for higher recording density. Ampex also introduced the 219 series of 19 mm digital videotape for D-1 recorders. Designed for multigeneration post-production applications, the tape is formulated with 850 Oersted cobalt gamma ferric oxide, and is available in 34- and 76 - min. lengths.
Reader Service #209

AMS HAS LOGIC 1 FOR AUDIOFILE

The AudioFile has rapidly become an attractive hard-disk based audio recording and editing system. In its Pod workstation it offers an eight-into-two submixer complete with two channels of mic/line input. Now there is the Logic 1, a new audio mixing console incorporating several new breakthroughs in its internal architecture and controls. It offers automation of all functions, while the environment is familiar to operators. The 32-bit floating point architecture has a dynamic range in excess of 1500 dB.
Reader Service #210

AMTEL INTROS LIST MANAGEMENT

Amtel's Transform 1 list management system enables use of inexpensive edit controllers to produce on-line ready edit decision lists. List management functions include list cleaning, list tracing, auto-assembly list optimization and audio ping pong. The system also conforms video edit decision lists to film picture and sound cut lists, and converts any video EDL to any other industry list format.
Reader Service #211

AMX IMPROVES S-VHS

Exhibiting its new product line of digital time base correctors in addition to its existing remote control systems, AMX demonstrated the new units to

improve the multigenerational performance of S-VHS and conventional video.
Reader Service #212

ANGENIEUX SHOWS MICROPROCESSOR-CONTROLLED LENSES

A new microprocessor-controlled 40:1 studio and field lens for CCD or tube cameras were introduced at NAB. The 40x9.5 for 2/3-inch and the 40x14 for one-inch are light and have very fast apertures of f/1.3 and f/1.9 respectively. The processor allows for controlled focusing . Both lenses have minimum iris ramping, superior MTF, and greatly reduced chromatic aberrations.
Reader Service #214

NEW ANALYSIS FROM ANRITSU

Anritsu's new video signal analyzer puts waveform monitors, vectorscopes and video noise meters into a single system. The unit's main function is end-to-end transmission testing. It conforms to both CCIR and FCC standards. Another new product, the M·2601A portable spectrum analyzer, offers a 10 kHz to 22 GHz frequency range. It has an automatic calibration function; built-in antennae factors and a quasi-peak detector enable it to perform EMI/RFI field strength measurements to CISPR standards.
Reader Service #215

ANTON-BAUER ADDS BATTERY EVALUATOR

The Probe battery evaluator is the latest accessory for the Lifesaver MP-4 and MP-8 microprocessor fast chargers in the Logic Series line. The Probe is computer-based and is programmed to do diagnostic, calibration, and revitalization functions.
Reader Service #216

APHEX DEBUTS PROCESSOR

The newest processor from Aphex, model 612, is billed as an expander. The downward expansion with variable ratio allows a variety of dynamics controls. It is also a "ducker," allowing a key input to lower the level of the audio input. It has instantaneous attack and follows any input waveform.
Reader Service #217

ARTEL COUPLES DEVICES

New fiber optic products from Artel include a sybiotic system that can double the capacity of fiber. The first is a high-powered 1550 nanometer laser transmission module, the T3080. It delivers EIA-250-B short-haul spec video and audio to R3070 receivers more than 40 kilometers away. It can also transmit 20 MHz video display. Combined with this are Wave Division Multiplexing (WDM) systems for both single- and multimode fibers.
Reader Service #218

ASACA SHOWS VIDEODISK RECORDER

Asaca has launched the ADR-5000 (composite video) and 5500 (601) magneto-optical rewritable videodisk recorders for TV production. Up to 10 minutes of random access video and sound can be repeatedly erased, recorded and played back. Additional disk drive units offer increased capacity to 100 minutes of color video.
Reader Service #219

ASTON INTROS CAPTION

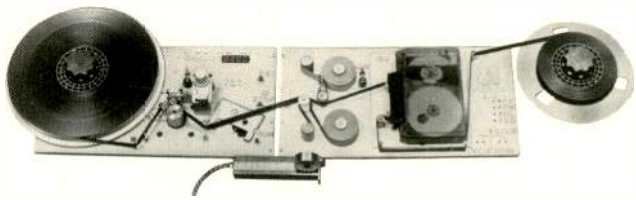
Making delivery in two months will be an extremely flexible character generator, the Aston Spectra. The unit will include all features found in the previous Aston IV, plus some. Full color is included, and so are fancy multiplaning, shading, angling for any font (italics), zip, reveal, ability to mark timing in exact seconds, crawl, wipe, squash, vectors, and others. The unit will sell for around $27,000.
Reader Service #220

AT&T OFFERS GRAPHICS SOFTWARE

AT&T Graphics Software Labs has come up with a complete package for the IBM Personal System/2. TOPAS (Three-dimensional Independent Object-oriented Processing and Animation Software) automates the creation of 3D models. The user can create full-color smooth 3D solid objects—and map—at up to 8192 lines.
Reader Service #221

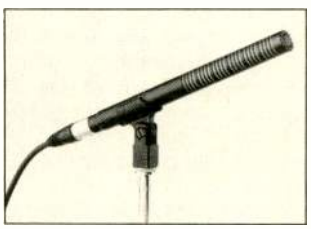
AUDICO INTROS ALL-FORMAT LOADER

The new Audico loader/reloader can reduce tape cost substantially over preloaded cases. The loader can be equipped for U-Matic, VHS, Beta, 8 mm, M-II, Betacam, and 19 mm. New formats, including those not developed yet, can be added later.
Reader Service #222



AUDIO KINETICS INTROS ES PENTA

A five-machine ESbus synchronizer/generator/autolocator controller oriented towards the music industry, but with a wide range of post-production application is planned by Audio Kinetics. ES Penta's features include crash record facility to allow rhythmical, manual entry and exit of record, auto record, controlled time expansion/compression of material within and standard loop, free assignment of master for time code distribution, and go-to points.
Reader Service #223



NEW AUDIO TECHNICA MICS, HEADPHONES

A new series of transformerless, externally polarized shotgun mics for longer-distance pickup is available from Audio Technica. The new mics offer lighter weight, higher output and lower noise than previous models. Additionally the company has introduced three new stereophones for broadcasters and engineers. The 900 series is intended for all critical formats. The ATH909 and ATH911 are open-back to allow for external sound. The 910 blocks out ambient sound for"on mike" operation at high levels without feedback.
Reader Service #224

PRODUCTION CONSOLES FROM AUDITRONICS

Featuring the 310 and 400 series of audio production consoles and the 200 on-air consoles, all boards were available for hands-on demonstration. The company also introduced an intelligent controller console interface.
Reader Service #225

AURORA INTROS NEW VIDEOGRAPHICS SYSTEMS

The AU/225 and AU/250 are the newest products in Aurora's expanding product line.They employ the Vista, along with standard hardware platforms. The 225 is based on an 80286 CPU at 12.5 MHz and has 80 MBytes disk storage, realtime video input, and three full picture buffers. 3D modeling, frame animation, and weather graphics are available as options.

The 250 is built around a 20Mhz 80386 CPU with 145 MBytes to 435 MBytes disk capacity. Floppy disks serve as backup. Picture manipulation tasks are handled through a 20 MHz math coprocessor. In addition, Aurora added Accuweather service to its AU/75 and added real-time animation and 3D modeling to the AU/280.
Reader Service #226

AUTOGRAM ANNOUNCES PRODUCTION CENTER

A microprocessor-controlled unit that connects through an RS232C port to a user-supplied computer to offer log encoding and timing functions has been announced by Autogram. The production center, with menu-driven software, connects to cart recorders to log all tapes and generate the list if on R/TV. The package costs $1995.
Reader Service #227

AVCOM DISPLAYS TEST GEAR

Specializing in satellite and microwave test equipment, the company brought its line of products including the new portable spectrum analyzer, PSA-35A, the new SCPC receiver, SCPC-2000E, and the SCPC-500-70 downconverter.
Reader Service #228

BASYS OFFERS NEW INTERFACES FOR NEWSROOM SYSTEM

Newsroom automation system Basys has added four new interface capabilities. They include the Nexis on-line information service and the ANGIS/Basys (Automated News Graphics Interface System) interface which allows multiple simultaneous entry of information from workstations to character generators. Other new interfaces include Rank Cintel's Gallery 2000 Image Library for digital stills management and Media Touch touch screen control systems, integrating operations.
Reader Service #229

BARCO SUPPLEMENTS MONITOR LINE

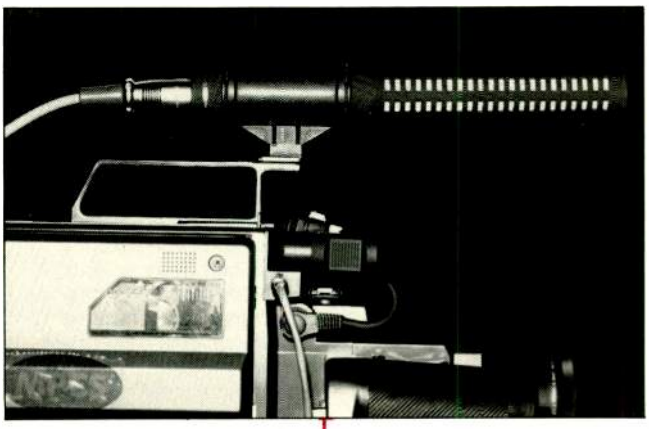
Barco Industries of Belgium has introduced a new microprocessor-controlled monitor, the CVM. It features a flat, square screen, automatic kinescope, and biasing for color temperature. It employs a comb filter and is remote control ready. A unique feature is its ablility to program and "remember" user needs such as image placement.
Reader Service #230

BE BRINGS ITS FIRST ON-AIR CONSOLE

The Mix Track 90 is Broadcast Electronics' first on-air console. The modular console comes in a 12 or 18 channel mainframe. Available modules include combined microphone and line input, VCXA gain control, Penney & Giles linear faders, control room and studio monitors, source remote control and studio remote. BE also unveiled a Phase Track 90 record/play stereo cartridge machine, a Microprocessor Video Diagnostic System (MVDS) remote control, and two new transmitters.
Reader Service #231

BELAR BRINGS MONITORING UNITS

Belar featured its full range of frequency and modulation monitors for AM, FM, SCA, TV. Also BTSC stereo television aural modulation monitors.
Reader Service #232



BEYER DYNAMIC SHOWS SHORT SHOTGUN

Beyer Dynamic has introduced the MCE 86 short shotgun mic. The versatile mic is meant for both studio and location for camera mount, fishpole boom, or hand-held applications. Also new is the M58 omnidirectional mic, designed specifically for ENG and EFP. It incorporates internal shock mount systems and the response is contoured with a subtle upper frequency rise for clarity.
Reader Service #233

BOGNER SHOWS NO BS

Launching its campaign of no BS (beam steering) in television antennas, Bogner demonstrated its theories on degradation of television reception by broadcast antennas.
Reader Service #234

BRABURY HAS DISTRIBUTION AMP

Brabury Porta-Pattern, the US entity resulting from the acquisition of Porta-Pattern by the British company, has introduced the T518 distribution amplifier, which carries composite video, pulse, RGB, and subcarrier signals. Designed by the BBC, the unit offers high performance and is expandable in bandwidth, cable and with differential inputs.
Reader Service #235

AMPLIFYING BRYSTON'S POSITION

Bryston showed its full range of quality amplifiers and preamplifiers including the popular BP-1 and the BP-5, which is available with switchable high level inputs.
Reader Service #236

BSD HAS NEW TBC

Broadcast Systems Design has developed the BSD 501 time base corrector. The unit has "after-the-fact" white balance; U-Matic, VHS, and S-VHS dub inputs and outputs; and pixel-by-pixel dropout compensation. It has an expanded bandwidth from an increased sampling rate,horizontal detail enhancement, and inherent NTSC chroma shimmer is eliminated. It is also available in PAL.
Reader Service #237

BTS UPGRADES TO VIDITEXT II

The Viditext II is an extensively upgraded version of BTS's Viditext character generator. Graduated backgrounds are available as a third plane between the system's text and background planes. Via a new third channel RS-232 interface, a keyboard can gain access to one or both high resolution channels. When equipped with the optional built in medium resolution character generator, up to six keyboards can function as off-line channels for updating messages.
Reader Service #238

BTS DEVELOPS D-1 VTR

BTS has unveiled the DCR 100 VTR, a modular unit that conforms to the SMPTE/EBU D-1 component digital videotape standard. The basic version is play-only, with one audio channel. Fully equipped, the unit includes video recording and playback electronics, four digital audio channels and a digital component coder. It also features distributed control, with a control panel that can control up to three machines from a distance of 180 m (up to 1 km with Cheapernet repeaters). An external PC can be connected to the internal diagnostic processor for easy servicing.
Reader Service #239

BTS HAS NEW CCD CAMERA

The LDK 900, based on the frame transfer sensors used in the LDK 90 portable camera, is a broadcast CCD camera designed for production uses. Its low center of gravity makes it especially good for action shots. It weighs less than 40 pounds, and becomes a light production camera with triax camera cable providing wideband RGB signals and base equipment. It shares the same lenses, sensors, triax cable, base station, and operational control panel as the companion LDK-90.
Reader Service #240

3D ANIMATION FOR THE AMIGA

The Byte-by-Byte corporation demonstrated its Sculpt-Animate 3D for the Amiga personal computer. The software employs ray-tracing techniques to create life-like images with colors, textures, and shadows. The final product is storable as a compressed animation file playable from RAM, or recorded in videotape. Optional output locations include single-frame VCR to control image rendering to a frame buffer card.
Reader Service #241

CANON INTRODUCES NEW PEDESTALS

Canon has added to its line of broadcast support equipment two pedestals—the MC- 200 and MC-300—featuring modular counterbalance systems with loading capacities of 30 kg to 130 kg. Other new items are the SC-15 cam head, which features a 50 degree tilt cam system for smooth tilt and pan, two portable tripods (TR-90, TR-60) and a lightweight, unidirectional, immobile dolly (CD- 10).
Reader Service #242

CANON INTROS BROADCAST TV ZOOM LENSES

Canon has unveiled three TV zoom lenses. Designed for CCD cameras, the J15x9.5B IRS HP features a built-in 2X extender and dynamic control range for zoom speed. Also intended for CCD cameras, the J15x9.5B IRS is a 15x zoom lens with built-in 2X extender, a focal length of :9.5-143mm, low distortion and improved chromatic aberration. The J50x9.5B 1E features a rotary shutter for high- speed shooting.

Reader Service #243

CEL LAUNCHES NEW LINE

CEL Electronics has a new list of TBC/synchronizer/digital effects units called the P164 series. The series compliments P147 series, but will meet full eight-bit digital 4:2:2 standard to EBU 601 broadcast specifications. The series is compatible with the existing Maurice touchscreen controllers. Also new is CEL's P1782 16 X 8 crosspoint video routing switcher, aimed at smaller facilities.

Reader Service #244

CENTRAL DYNAMICS HAS NEW SWITCHER

Central Dynamics, which recently merged with International Datacasting Corp., has come out with a new production switcher, the Strata-10. Features include simultaneous dynamic processing of up to 10 levels of video, seven keys of three backgrounds; range of key and title level selection/mode; ISO keyer system; storage of up to 80 setups; priorities for transitions; a multiview selector; 16 matte generators; four pattern generators; six mask generators. It can handle 18, 24, or 30 inputs in video, 10 external inputs, and eight RGB inputs.

Reader Service #245

CENTRO UNVEILS NEW PRODUCTION TRUCK

The Centro Corp. has announced the EFP-1, a mobile unit built on the Ford E-350 chassis. The vehicle can be configured to a five-camera, 11-person crew ENG/EFP truck. EFP-1 incorporates one-inch and ¾-inch capability. It has hinged VTR service bays, and can handle separate camera control and monitoring, videographics, and on-line audio mixing.

Reader Service #246

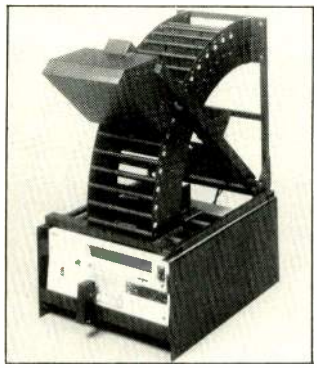
CETEC VEGA WIRELESS MIC TECHNOLOGY

Cetec Vega announced the Pro 2 true diversity wireless mic system with dbx noise reduction. It's designed for lavalier and handheld mics. Cetec also showed the compact model QTR-1 portable wireless intercom unit and the QX-6 master station which controls up to six "Q" portable units and a wide variety of wired-intercom systems including Clear-Com, RTS, ROH and most "carbon mic" systems. The master station operates on 115/230 VCac, 50-60 Hz or +11.5 to + 24 Vdc.

Reader Service #247

CHANNELMATIC IMPROVES BROADCASTER

The Broadcaster II is the next generation of Channelmatic's original automatic



videocassette changer. The unit features a new clamp mechanism and VCR-mounting assembly. It has random access of up to 15 videocassettes, is under microprocessor control, and seven day programming. It can be used as an automatic tape duplicator with an external video source.

Reader Service #248

CHRISTIE REJUVENATES

The Universal Battery Support System is now available from Christie Corp. It employs PC technology and the Reflex charging method. The CASP/1000, or Wonder Box, rejuvenates NiCad batteries by erasing memory and restoring badly faded capacity. In addition to NiCad, it can recharge Zinc-Silver, Lead-Acid, or Lithium batteries.

Reader Service #249

CHYRON UNVEILS SCRIBE JR.

The Scribe Jr. is a fully contained, compact version of Chyron Corp.'s Scribe and Superscribe high-end character generator. All fonts and user created graphics are antialiased. It is upwardly compatible with Scribe and Superscriber. Options include logo compose, preview channel, auxiliary entry, dynamic read effects, Winchester hard disk storage, font memory expansion, additional input devices and full component RGB.

Reader Service #250

CLEAR-COM: STATION ISO SYSTEM

Clear-Com bowed the ISO-4000 Station Isolate System which establishes private two-way communication paths between two or more Clear-Com stations in a conference line intercom system. It is expandable to isolate up to 16 stations from multiple control points. Also launched: the WBS/WTR Wireless Intercom System consisting of the WBS-6 Base station WTR-1 Portable Transceiver and accessories. The product features full-duplex operation; each portable unit functions like a wired intercom station. A dynamic compander circuit provides wide audio frequency response. Up to six portable transceivers can be supported.

Reader Service #251

CMX IMPROVES THE 6000

CMX has added several major new features to its 6000 random-access post-production system. A new technique called M2 addresses the incompatibility problems between film and video to produce both a negative cutter's list and an edit decision list. A new Multi-Cam feature permits multiple-camera random-access editing, previously not available with the 6000. Additionally, a dual-headed videodisc player has been developed for the system, cutting recording time in half.

Reader Service #252

COLORGRAPHICS INTRODUCES DP-4:2:2

The new DP-4:2:2 multipurpose hardware platform that will perform a variety of graphics tasks (paint, animation, layering and compositing, etc.) in the component digital domain. The device has a 4:2:2 external interface and internal 4:4:4:4 processing, along with SMPTE RP-125 digital video and analog RGB-to-digital video conversion. The unit features multiple menu windows with interactive menus, and a pressure-sensitive stylus. Features include real-time capability with full color, antialiased cutouts and simultaneous foreground and background stencils. It has mix effects through its internal linear key channel and two internal key pages.

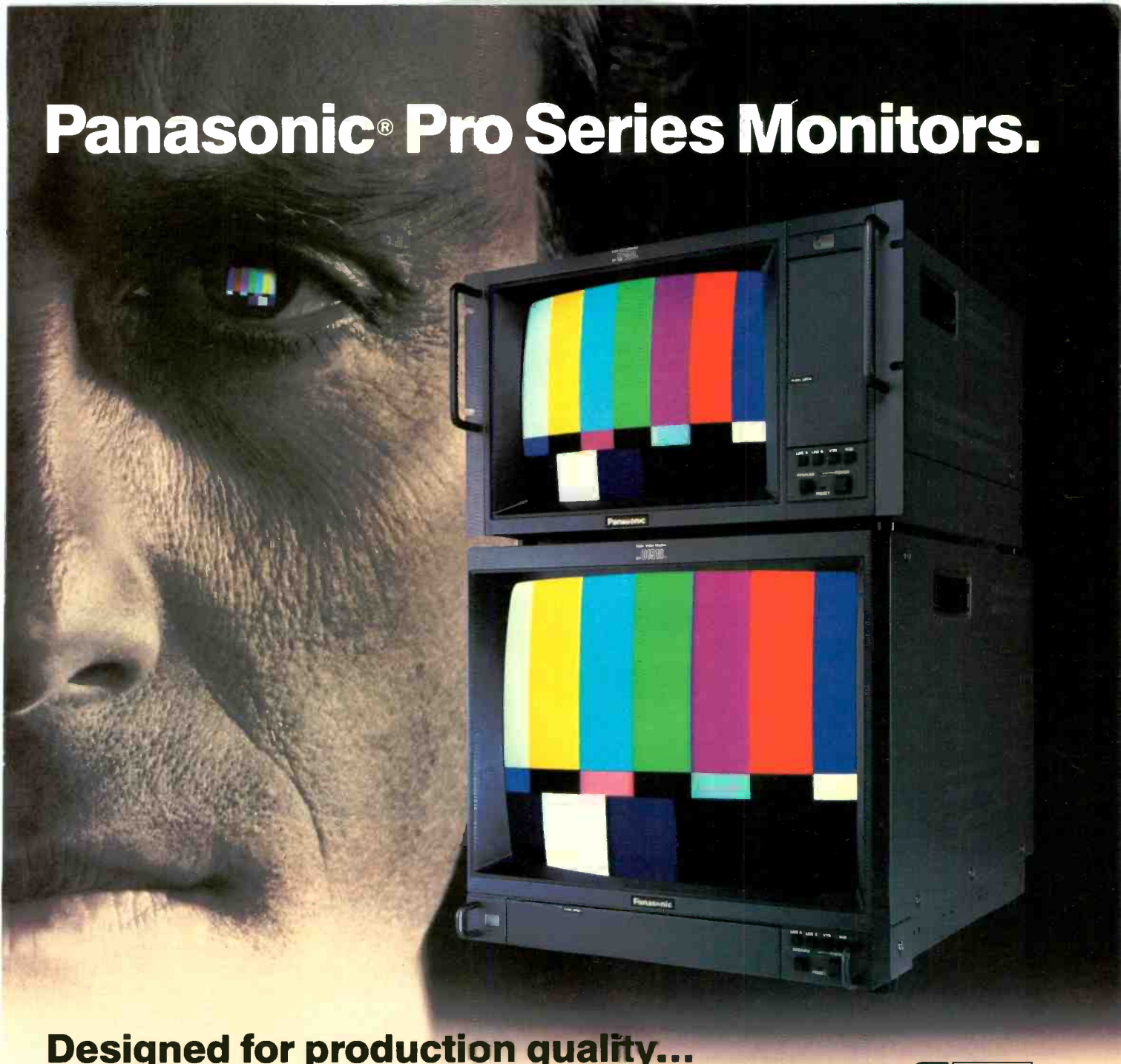
Reader Service #253

COLUMBINE DEVELOPS INTERFACE

Columbine has introduced an interface between its Columbine/News Management software and the Newsprompter 1 teleprompter, manufactured by QTV. With the new interface, scripts are transferred electronically to the telepromter. Columbine also introduced New England Digital interfaced software in conjunction with their new marketing agreement with NED, bringing the technology to radio.

Reader Service #254

Panasonic® Pro Series Monitors.



Designed for production quality... With an eye on your budget.

S-VHS

Panasonic presents two very versatile, high-grade color monitors--the BT-D1910Y and the BT-M1310Y. Built for performance, these BT-Series monitors offer you the quality and reliability you've come to expect from Panasonic. Not to mention a wide array of features at an affordable price.

Our BT-Series provides you with the controls and connections necessary for studio applications--while serving a host of industrial, educational and professional video needs.

For maximum performance and versatility, both monitors offer complete, direct compatibility with the new S-VHS format--in addition to conventional signals. And video reproduction on the BT-Series is superb. As a matter of fact, the BT-M1310Y boasts a horizontal resolution of more than 560 lines, while the BT-D1910Y offers you greater than 550 lines.

What's more, each monitor provides you with a full set of front panel controls. Like Line A/B split, S-Video input connectors, Blue single-only switch, pulse-cross circuit, preset picture off/on, comb/trap filter selectable and normal/underscan switch, just to name a few.

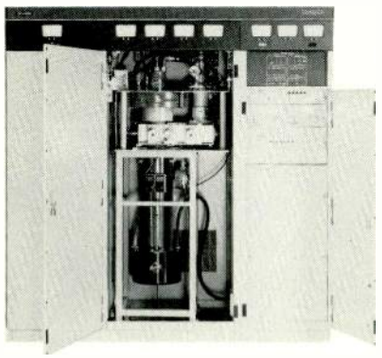
So when you are looking for professional quality, but still need to keep an eye on your budget, look into the Panasonic BT-Series high-grade monitors. For more information, call Panasonic Industrial Company at 1-800-553-7222. Or contact your local Panasonic Professional/Industrial Video Dealer.

Panasonic
Professional/Industrial Video

Circle 139 on Reader Service Card Page 91

COMARK ADDS NEW KLYSTRODE

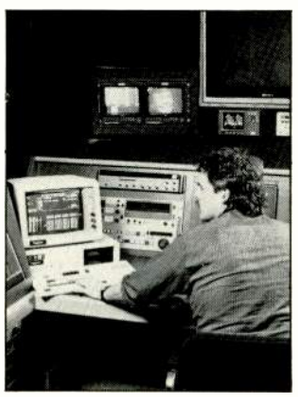
A 60 kW klystrode amplifier, exiter, and control cabinet are part of the brand-new 120 kW SK series from Comark Communications. This series of UHF transmitting systems runs the span up to 240 kW. The basis of the new series is the



revolutionary UHF Klystrode. Designed as stereo ready, the unit features simplified tuning of wideband external capacity Klystrode power amplifiers. The exciter system is ultra-linear and fully redundant.
Reader Service #255

COMLUX DELIVERS VIDEO ENCODER/DECODER

The Comlux 2507/2508 video codec features professional quality analog antialiasing and post-aliasing filters. A wideband data channel allows a combination of digital program audio and other data protocols to be transmitted at the same time without distortion. The 2507 accepts all common composite color video signals, passing the analog input through a level-setting stage and antialising before binary encoding.
Reader Service #256

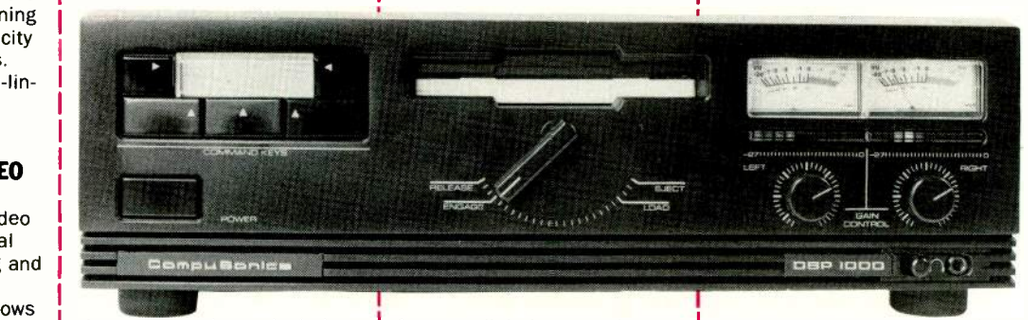


COMPREHENSIVE LAUNCHES EDIT CONTROLLER

Comprehensive Video's Edit Master cuts-only edit controller software combines interformat capabilities with 900-edit internal memory and list management. Edit Master works with time code, control track or combination to control most editing recorders and players including S-VHS and includes full list management capabilities. Suggested list price is $3,995.
Reader Service #257

COMPUSONICS COMPATIBLE WITH SONY DIGITAL AUDIO

Compusonics has developed a new interface that makes its DSP 1000 compatible with the Sony 1610/30 digital audio format. The optical disc recorder/editor can now perform direct digital-to-digital transfer and enable the Sony digital audio processors to encode and transfer digital audio data from the Compusonics for video uses. The company has also introduced a hard disk



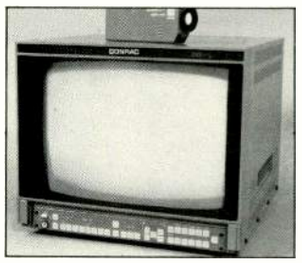
storage expander, a dual playback unit, MacSonics and MacDJ software packages, and studio interface accessories.
Reader Service #258

CONNOLLY DISPLAYS NEW SEQUENCER

Connolly Systems' new VTR-100 VTR sequencer and switcher controller, designed as an alternative to cart decks, can control up to 16 machines with automatic program recognition and time-code-based cueing and replay. It has a 200-event memory and has a full list of transmission relay monitoring and on-air functions including a 10-event "next on-air" window. Options include serial port interface for off-line schedule input, extra memory, color status display, and caption generation and status logging.
Reader Service #259

CONCEPT INTROS CAPS II

The CAPS II (Computer Assisted Programming System) from Concept Productions manages automated programming for walkaway, live, or satellite audio programming. It interfaces with traffic systems for auto loading. The new system features R-DAT tape decks and 120 hours of random-access storage. This unit can house all station programming for one week—an estimated five days of walkaway.
Reader Service #260



CONRAC BRINGS MICROMATCH

Conrac has introduced a monitor-photometer system that features digital automatic setup. The system compensates for CRT aging and component variation by maintaining CRT bias at the proper levels. Available in 13- and 19-inch models, the 6545 monitor features a dot-mask, precision in-line CRT with 600-line resolution.
Reader Service #261

CONTINENTAL ELECTRONICS HAS SOLID-STATE TRANSMITTER

Continental Electronics, a division of Varian Associates, introduced its first totally solid-state FM transmitter. The 814C 3.8 kW features single-phase power supply. The splitter/combiner technique is used, based on a 700 W broadband amplifier module to achieve a rated power output of 38 kW.
Reader Service #262

CRL SHOWS SUBCARRIER GENERATOR

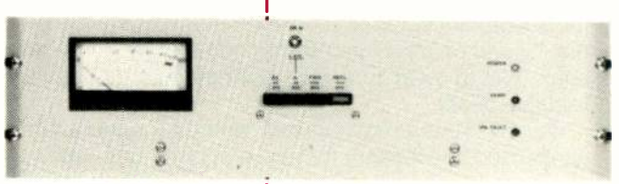
CRL's new SCA-300B subcarrier generator is frequency locked and digitally synthesized. Its integral two-band audio limiter increases the intelligibility of voice or music. The user can program different subcarrier frequencies and deviation levels. It has full remote capability, crosstalk protection, and direct modular inputs via RS-232 or BNC connectors on a rack-mounted chassis.
Reader Service #263

CROSSPOINT LATCH HAS NEW SWITCHER/TBC

The Crosspoint Latch 8200 combines a full switcher with two digital TBCs. The device, which has a joystick positioner, comes with 12 wipe patterns with hard and soft variable borders. It features auto transitions with variable rate control, and a host of effects, including posterization and mosaic. An S-VHS version, the 8200C, is also available.
Reader Service #264

CROSSPOINT BOWS NEW PRODUCTION SWITCHER

Crosspoint Latch's new 6129 is a post-production switcher that can also used for production. It is fully computerized, with 400-event memory and GPI transitions. Multiple key levels allow the user to avoid multiple generations of passes on a single tape. Features include five levels of video plus



matte keyer displayed at the same time, two downstream keyers, two chroma keyers and four input DSK, drop shadow and outline. Suggested list base price is $10,995.
Reader Service #265

CUBICOMP DEVELOPS NEW ANIMATION SYSTEM

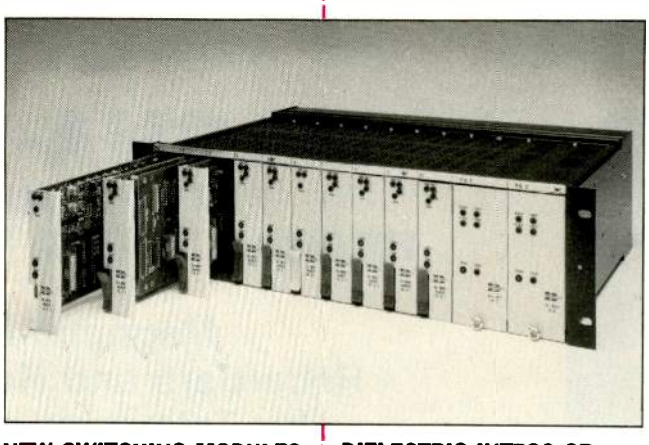
Cubicomp has introduced a new high-end, standalone animation system in its Vertigo product line. The V2300 operates entirely on the Silicon Graphics 4D/70 superworkstation, with no peripheral boxes needed. It handles video in and out and tape control using Cubicomp's V32 frame buffer and codec analog converter. All modeling, rendering, and animation are performed directly on the system. Although the V2300 runs the same V2000 software as the Vertigo V2400 and V2600 systems, it does not require a Sun computer for rendering or video support. It is SMPTE 4:2:2 compatible.
Reader Service #266

CUBICOMP ACCELERATES RAY TRACING

Cubicomp's new RACE render accelerator boards make ray tracing practical for PC-based PictureMaker 3D animation systems. The RACE board's CMOS and VLSI technology provide a processing subsystem with a raw processing speed of 10 MIPS, turning the PictureMaker into a 20 Mflop render engine with no sacrifice of system functionality, according to the company. The new ray-tracing software is part of PictureMaker Version 3.0 software, which is available as a $2500 upgrade to existing systems.
Reader Service #267

CURRENT EXHIBITS POWER

Current Technology demonstrated its power product lines in full, including the Power Siftor, power conditioning system.
Reader Service #268



NEW SWITCHING MODULES FROM DATATEK

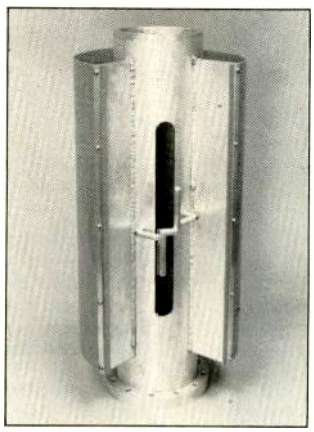
The Datatek D-800 series 10x1 audio and video switch modules may be mounted in a universal-type frame to form multi-level systems, and can be configured for S-VHS or M-II format switching, as well as other traditional formats and a wide range of video and audio setups. System specs include 30 MHz bandwidth, 0.08 degrees differential phase, 0.08 percent differential gain and audio distortion at +32 dBv of 0.035 percent.
Reader Service #269

dbx ANNOUNCES REAL-TIME ANALYZER

The new RTA-1 real-time analyzer from dbx performs precise, comprehensive sonic analyses of signals and noise as well as rooms, equipment and transmission media, using the music itself as the test signal. Capabilities include frequency-response analyses using music, the unit's own stereo (uncorrelated) pink noise or tones; precision third-octave topology using triple-tuned filters, ISO-centered 31 bands; and more.
Reader Service #270

DIELECTRIC INTROS CP UHF ANTENNA

New from Dielectric Communications is the UHF CP antenna, described as the first truly circularly polarized UHF pylon antenna. The antenna can broadcast either full circular polarization or partial vertical component, as desired, and can be designed and manufactured to provide any ratio of vertical to horizontal component. Regardless of ratio, it maintains nearly 90-degree phase quadrature between polarizations throughout the vertical radiation pattern.
Reader Service #271



DIGITAL ARTS UPGRADES ANIMATION SYSTEM

DGS 2.1, the latest version of Digital Arts' PC-based 3D animation system, now includes auto-trace capability as part of its 2D modeler; the edges of the images thus digitized are then converted into spline-based shapes for use in the DGS 3D modeler. The DGS 2.1 Scenes motion scripter can now individually adjust every animation channel, with respect to both key frames and velocity profile. The Render module has lost its previous software limitations on the number of polygons, lights and surfaces in a single rendering. The software remains priced at its previous level of $15,000, with turnkey systems ranging from $35,000 to $50,000.
Reader Service #272

DIGITAL F/X INTEGRATES GRAPHICS AND EFX

High-end digital effects and graphics capabilities are combined in the new DF/X 200 from Digital F/X. Built around custom VLSI chips and a 32-bit Intel 80386 CPU, the system utilizes 4:4:4:4 digital processing throughout. The system's core is the Image Translator (I/T), a real-time, multifunctional video processor that integrates the functions and provides a consistent user interface. The DF/X 200 also features frame capture, a still store library, a graphics toolbox and a fast airbrush with full transparency control.
Reader Service #273

DIGITAL AUDIO GOES MULTICHANNEL

Digital Audio Research has introduced the SoundStation II, a digital audio recorder and production center with comprehensive multichannel editing features. The four-channel system combines multichannel

digital audio recording with direct-access sound editing as well as extensive digital signal processing. It performs compli-

cated audio edit manipulations immediately with no degradation of sound quality.
Reader Service #274

DI-TECH EXPANDS 5860 SWITCHER LINE

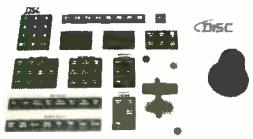
Di-Tech has added three new products to its 5860 routing switcher series. The Model 5863 RS-422 data routing switcher provides a means to allocate serial-controlled devices within a video/audio matrix. Each seven-rack unit frame houses a matrix up to 32 by 32. Larger systems can be built with additional frames. Also new was the Model 5865 video combiner, which is used to expand video switching systems from 64 inputs to as many as 256.
Reader Service #275

DOLBY DECODES SURROUND

Dolby unwrapped its new digital QPSK System and launched the Dolby SDU4 Surround Decoder. Designed to monitor Dolby Surround Sound, it can monitor off-air or recorded signals originating from Dolby stereo film soundtracks or Dolby-surround-encoded material for video or stereo TV. The unit facilitates aural checks for compatibility with mono, conventional two-channel stereo or fully decoded surround sound. Dolby also showed the 365 two-channel interface for SR and Dolby A and the 280 and 431 spectral recording modules for use in the 360 and M series and multi-track applications respectively.
Reader Service #276

DSC PREMIERS COLLAGE

The new Collage from DSC is a D-2 digital compositor for multichannel compositing of multi-layered effects and sophisticated program segments. It can composite directly to D-2 tape machines and digital disk recorders. It includes an editor interface that allows quick building of complex, layered productions without degradation, and accepts five video sources and three key signals as external inputs. The D-2 interface option provides interfacing to any standard analog medium including VTRs, paint systems, animation systems, CGs, digital video effects, and more. It interfaces with the company's DiSC system to form a tapeless production center.
Reader Service #277



DISK RECORDER HAS 200-SECOND CAPACITY

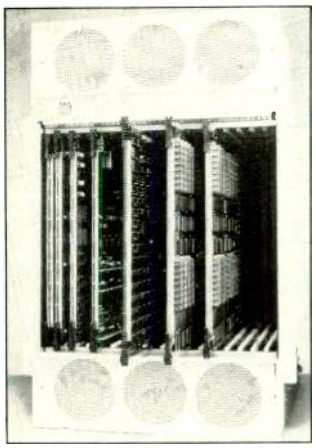
The new DiSC real-time digital disk recorder from DSC offers 200 seconds of video recording capacity with Winchester disk drives. This composite digital system is compatible with D-2 format VTRs. Features include simultaneous record and playback for fast multilayering work without generational loss; a combiner option that allows three foreground videos to be layered over the background, with priorities, mixes and fades; a two-disk configuration that lets one disk play back while the other records its output; and many more.
Reader Service #278

DSC SX-2000D OFFERS MULTI-LAYERED EFX

The Digital Services Corp. SX-2000D is a programmable digital effects system combined with two M/Es and five keying amps into a single integrated unit. The efx/switcher combination offers one-pass control of multi-layered effects for both increased creativity and lower production costs. The unit is completely programmable and can be triggered by an external editor or other controller.
Reader Service #279

DUBNER OFFERS DIGITAL WORKSTATION

The Graphics Factory is a new digital graphics workstation from Dubner Computer Systems. A modular, expandable system, the Graphics Factory operates internally in the D-1 component video standard, with RGB and NTSC outputs standard. The core of the system is the GF-30 high-resolution, antialiased character



generator, a dual-channel, true dual-operator device based on two 4:2:2 digital component frame buffers. Options include video painting, real-time animation creation, 3D modeling and rendering, and library/still store.
Reader Service #280

NEW CONTROLS FOR DYNAIR SWITCHERS

The Dynastar series from Dynair includes eight system controller packages and a new control panel, all designed to provide new features for Dynair routers. The MiniStar control panel functions as a single-bus panel or a full matrix control. It is a compact, inexpensive unit available in left-hand or right-hand configurations. Also new is the StarPack system manager, which provides source restriction, passcode-protected destination locking, and alphanumeric operation for source and destination.
Reader Service #281

PC WORKSTATION FOR DYNATECH NEWSTAR

Dynatech NewStar has unveiled a software package for PC/AT and PC/386 personal computers and compatibles. It is the first NewStar configuration to employ off-the-shelf hardware. Hardware requirements are a PC/AT operating at 10 MHz or faster, or an 80386-level machine. 640K of memory, a monochrome or color monitor, and at least one floppy disk drive are also required. The company will continue to offer its proprietary Zentec workstations.
Reader Service #282

EASTMAN KODAK TARGESTS SP MARKET

Citing the growing acceptance of the Betacam SP component video format, Eastman Kodak has unveiled a new Betacam SP videotape. The new Eastman Pro Format SP broadcast videocassettes claim the excellent coercivity needed to maintain the high signal output of the boosted FM carrier frequency. The new tape also has very low noise levels and is designed to withstand as many as three generations of duping without noticeable loss of signal.
Reader Service #283

MODULAR EDITOR FROM EDITRON

Editron is now offering the 520, its latest video editing system, which continues the company's modular, expandable concept. In addition to the editor itself, the 520 incorporates a synchronizer, time code generator and composite video generator. The system features an extensive, software-based machine library for interface to a wide variety of hardware. The synchronizer will control VTRs, ATRs, sprocketed machines, audio and video mixers and switchers, as well as laser disk players and other digital devices.

Reader Service #284

NEW EDITOR HAS OPTIONAL SLOW-MO

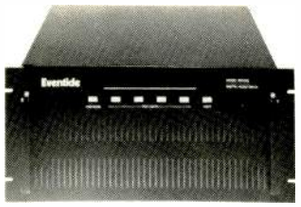
The 900 Plus video editing system from EECO/Convergence is an A/B roll edit controller with optional, programmable slow motion for multiple serial VTRs. The 900 Plus has a 1000-line internal edit list memory and receives time code signals through serial control cables from the VTRs' Reader boards. Time code can also be cabled separately to the controller's built-in Readers. It offers full VTR assignment capabilities and a full complement of list management features.

Reader Service #285

EEV EXTENDS KLYSTRON RANGE

EEV has broadened its range of television klystrons at both ends with the introduction of two new models. The K3153BCD is the company's first external cavity air-cooled wideband klystron which, along with the associated K4153 series of circuit assemblies, is designed for operation in the 470-860 MHz range. At the high-power end, EEV has introduced the K3773BCD 70 kW wideband klystron and K4653 series circuit assemblies, with extended frequency range and increased rated peak sync output power.

Reader Service #286



EVENTIDE BLEEPS TELEVISION

Eventide has introduced a television-station counterpart to its seven-second audio obscenity delay units, in wide use on radio talk shows. The BD-1000 is a solid state RAM-based device that offers from one to 20 seconds of video delay, depending upon the amount of memory installed. Used in conjunction with the company's BD980 stereo audio delay, it allows live television programs to be delayed, keeping potentially obscene or libelous behaviour or actions safely off the air.

Reader Service #287

EVERTZ PREMIERS VCR CONTROLLER

The e.MDSU/2.MDNM/ (evertz emulator II), from Evertz Microsystems, is a compact, intelligent machine controller for half-inch VCRs, including S-VHS units. It allows control of these machines by editing equipment designed for serial control of 3/4-inch and one-inch VTRs. It will cue up, preroll, synchronize, shuttle, and jog frame-by-frame all with 100% position accuracy, and is compatible with edit controllers from all major manufacturers.

Reader Service #288

NEW HARDWARE BOOSTS CVI

A new version of the CVI computer video instrument, the CVI Plus, has been introduced by Fairlight Instruments. This low-cost video effects and graphics generator features redesigned hardware and software for faster programming with fewer menus, which new have easy-to-use icon selection. New features include a full-screen frame store, a computer-style keyboard, and new effects such as live picture inversions and reverses and push-on/off fields.

Reader Service #289

DETAIL PROCESSOR ENHANCES FAROUDJA ENCODER

Faroudja Labs has extended its SuperNTSC product line with the introduction of the CTE-DP detail processor, a $1200 option for the company's CTE-N NTSC encoder. The CTE-DP improves the visibility of small details in the vertical and horizontal domain without excessive enhancement of large outlines. This device uses luminance and chrominance information to correct for the lack of resolution due to source softness, or due to the common violation of the constant luminance principle in chroma saturated areas. Improvement is especially evident in film chain applications.

Reader Service #290

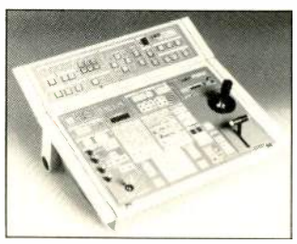
FIDELIPAC CARRIES CARTS

Demonstrating the entire family of Dynamax cart machines, Fidelipac featured the CTR100 Series that allows intermixing of cartridges using the proprietary Cartscan technique. Also displayed were the CTR10 utility series of decks and the CTR30, three deck units that record.

Reader Service #291

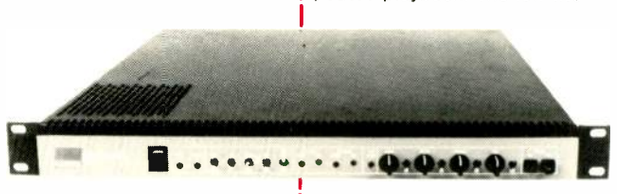
ECONOMICAL EFX FROM FOR-A

For-A's new MF-2000 is an expandable digital effects generator with both composite and component inputs and outputs. It provides a large array of 2D effects for broadcast and post-production, including compress, spin, tumble,



posterization and mosaic. System memory allows multiple effects sequences to be preprogrammed and stored for subsequent execution. A dedicated control panel identifies each function key with ideograms for ease of use. The basic system costs $19,500.

Reader Service #292



FORTEL SHOWS MULTIFORMAT PROCESSOR

Compatible with most 3/4-inch and half-inch videotape formats, the new SuperPro 200 multiformat video processor from Fortel provides such capabilities as interformat transcoding, picture enhancement, infinite window time base correction and frame freeze. It accepts inputs from U-matic, VHS and S-VHS dub sources as well as NTSC composite video. Output formats are independent of the inputs and include Y/629 dub, S-VHS dub, Y,R-Y,B-Y and NTSC composite. The system is priced at $8995 and is available now.

Reader Service #293

FOSTEX UNVEILS MIDI MIXERS

The brand-new 40 Series audio mixers from Fostex are inexpensive, high-quality units designed for MIDI work and other audio applications. The mixers, in 12-, 18- and 24-input versions, were expected to become available at the end of April. Fader inputs for tape or line allow the number of inputs to be effectively doubled, with a 12-input model handling 24 inputs, for example. Prices are $2995 for the 12-input model, $3995 for the 18-input and $4995 for the 24-input.

Reader Service #294

FREZZI/PAG DEBUT HIGH-TECH FAST CHARGER

The new PAG Speedcharge 6000 microcomputer-controlled fast charger for nicad batteries, distributed in this country by Frezzolini, uses the battery cells as their own sensors. It automatically determines the battery type connected and analyzes cell characteristics continuously as it charges. Any battery faults are indicated.

Reader Service #295

NEW BETA TAPE FROM FUJI

Designed for ultimate Betacam and Betacam SP system performance, Fuji Photo Film's new H321E oxide Betacam "S" cassette features a low friction coefficient to ensure stable tape transport, even after repeated playback. The low friction also contributes to extended head life, according to the company. The new tape boasts high video and color

S/N ratios. The antistatic leader tape and durable new binder keep dropouts to a minimum.
Reader Service #296

FUJINON FOCUSES ON HDTV

Fujinon has introduced a range of new lenses for HDTV. Three new fixed-focus, f/1.4 lenses for 1.25-inch format cameras

have 13 mm, 25 mm and 70 mm focal lengths, with horizontal field angles of 71, 41 and 15 degrees, respectively. The company also introduced a 16-80 mm zoom for 1.25-inch cameras, the HP5x16SD. For one-inch format cameras, the company unveiled a new 18 mm fixed focal length lens and two zooms. The HR11x11SD is an 11-121 mm zoom with constant f/1.8 maximum aperture to 110 mm. The second new one-inch zoom is the HR22x18SD, with focal range of 18 to 400 mm and maximum aperture of f/1.8 flat to 350 mm.
Reader Service #297

GENIGRAPHICS EXPANDS 3D CAPABILITIES

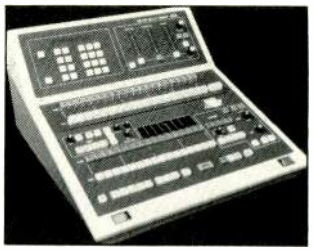
Genigraphics has unveiled new Version 5.1 Model Shop and Animator software for its PGP Professional Graphics Workstation. The new release extends the complexity of 3D models that can be built on a PC-based platform and further improves the user interfaces. With Model Shop 5.1, the PGP can create shapes by moving 2D outlines along a 3D spline path. Outlines can be turned, rotated and scaled as they travel along the path, producing a variety of complex 3D objects.
Reader Service #298

FREQUENCY EXTENDER BOOSTS TELEPHONE REMOTES

A new top-of-the-line frequency extension system from Gentner Electronics, the EFT-3000, is designed to provide the highest quality audio possible for telephone remotes. It provides a frequency response of 7.5 kHz over three standard dial-up telephone lines using digital signal processing. If three lines are not available, the EFT-3000 will operate over two lines (at 5 kHz) or even over a single line (at 3 kHz).
Reader Service #299

GRAHAM-PATTEN SHOWS COMPONENT KEYER

The latest addition to Graham-Patten's 1230 Series video keying systems is the 1237, a component video keyer that allows freestanding or downstream keying of RGB signals. Features include RGB inputs and outputs, optional sync input for fade to black, master key clip and key gain adjustments, and remote operation of key mix and fade to black, if desired. Inputs include thee program (R, G & B) loop through, three key video (R,G&B) loop through, one key control loop through and one component sync (optional for fade to black.
Reader Service #300



STANDALONE MC SWITCHER FROM GVG

The new Master-21 master control switcher from Grass Valley Group offers a functional control panel, dedicated video and stereo audio matrix and the ability to interface with routing switchers for input expansion. In its standard configuration, it has 16 video/stereo inputs, four stereo audio-only inputs, a four-input accumulative keyer with matte generator, built-in user-changeable preroll with machine start delays, stereo synthesizer enable and built-in system diagnostics, among many other features. The Master-21 lists for $16,950.

Reader Service #301

GRASS PREMIERS DIGITAL ROUTING SYSTEM

The new DHX-532 parallel digital routing system from Grass Valley Group is designed to operate as a level of a Horizon routing system or to extend a Horizon level. The system comes in blocks of eight input/output increments, from eight by eight to 32 by 32. Power consumption will be less than half that of competitive systems, the company states. The 10-bit system is fully compliant with international parallel digital standards. Eight-bit signals are fully accommodated at both input and output.

Reader Service #302

GRAY UNVEILS TELECINE TIME CODE

Gray Engineering's new DT-104FC is a SMPTE longitudinal time and control code transmitter designed to interface to telecine equipment. It functions as a time code generator, with transport tracking facilities that provide a locked count based on film frames. The unit retains the standard time code generator functions of Gray's DT-104F while adding three modes of operation for film transfer, with special care taken to minimize jitter in the outputted code. The unit costs $5950.

Reader Service #303

VIDEOSCOPE OFFERS VECTOR, WF DISPLAYS

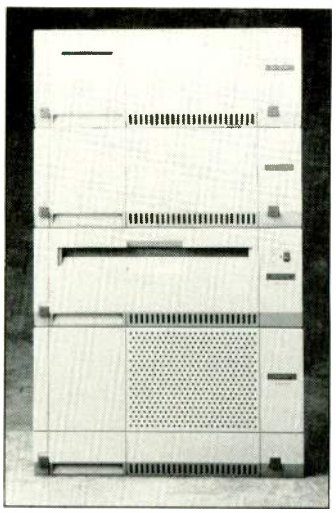
Hamlet Video's HVI 200 series VideoScope combines waveform and vector measurements in a single device, available for both NTSC and PAL standards. This eight-bit digital device superimposes its displays on the monitor screen, avoiding the problems associated with CRT displays. It is available in composite and component versions and offers a choice of three displays: full-screen waveform, full-screen vector, or small-screen dual wf/vector.

Reader Service #304

HARRIS EXPANDS TRANSMITTER LINE

Harris Corp.'s Broadcast Division has unveiled the DX-25, a digital, solid state 25 kW AM transmitter that features the company's patented digital amplitude modulator. The DX-25 provides exceptional signal clarity from low harmonic and IM distortion, with essentially no audio overshoot, tilt or ringing, according to the company. It also offers typically high overall AC to RF efficiency for substantial power cost savings.

Reader Service #305



STILL STORE AND MORE FROM HARRIS VIDEO

The new HarrisVws Video Workstation from Harris Video Systems is a digital video workstation that offers massive still storage with full CCIR 601 digital I/O. Drawing on technology from Apple Computer, the HarrisVws incorporates the operating system of the Macintosh II computer for streamlined, straightforward still management and manipulation. It consists of a rack-mounted assembly containing the 32-bit system controller with internal Winchester drive

and 3.5-inch floppy drive; the Harris-built Model 422 frame buffer/synchronizer; and a color control monitor, keyboard, and mouse or trackball. Dissolves and wipes are supported, along with sophisticated database management. Future enhancements will include a graphics composer, paint system, titling, and full digital video effects.
Reader Service #306

ON-AIR BOARD FROM HARRISON

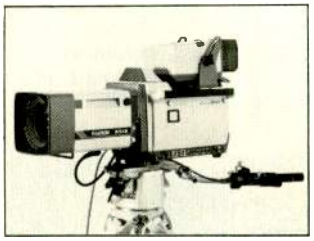
Harrison's new Air-790 is a modular on-air radio broadcast console available in 20-, 28- and 36-position main frames. Three types of input modules are offered: stereo line input, mono microphone input, and remote line input. Other available modules include two program modules, one with circuitry for Stereo One program, Mono Three program and Clean Feed program outputs, the other with circuitry for Stereo Two, Mono Four, and Auxiliary program outputs.
Reader Service #307

HEDCO INTROS NEW TEST GEAR

A pair of new test generators from Hedco include the PTS-100 portable test signal generator and the HTG-100 Hedline audio tone generator. The PTS-100 offers 10 digitally derived video signals plus 400 Hz and 1 kHz audio frequency; removable PROMS permit the video signals to be changed. It operates at 115 V ac and costs $2800. The HTG-100 supplies test signals of 400 and 100 kHz at -10, 0, +4 and +8 dBm dual output levels. It is a portable unit priced at $375.
Reader Service #308

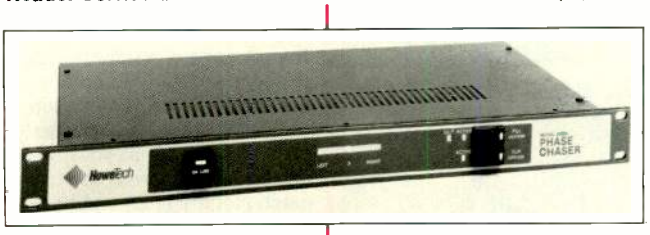
HITACHI INTROS AUTO SETUP CAMERA

The SK-971 is the latest addition to Hitachi's Computacam family of auto setup broadcast cameras. This studio/field camera, with 2/3-inch LOC diode-gun Plumbicons, has a newly developed f/1.2 high-speed prism. It features wideband RGB triax control (7 MHz for G and 6 MHz for R and B), plus ac utility power at the camera head. The camera's auto setup system utilizes Zero Method control, which sets up the RGB channels to achieve the highest picture quality at all times, the company states. In addition, the auto setup system provides real-time lens error correction and fault diagnosis.
Reader Service #309



NEW-GENERATION WIRELESS MICS FROM HME

HME's new 50 Series wireless microphones feature a two-channel body pac, newly designed handheld transmitter and two-channel switching diversity receiver. Also, a brand-new RF link greatly improves the capture ratio for dropout-free performance. The system includes the NRX-11 noise reduction system, mic-mute and power switch lockouts on the handheld transmitter, and operator-selectable RF frequency selection on the body pac.
Reader Service #310



PHASE CHASER ENTERS FOURTH GENERATION

Howe Technologies has introduced the fourth generation of its audio time base corrector, the Model 2300A Phase Chaser. The unit provides automatic detection and correction al all interchannel time delays in stereo audio program material, avoiding the resultant loss of mono compatibility. It can discriminate between systematic time delay (such as tape head misalignment) and intentional phase fluctuations in the program material.
Reader Service #311

IKEGAMI CELEBRATES CAMERAS

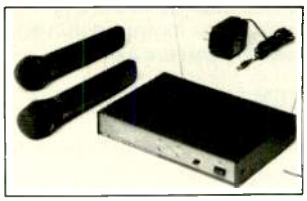
Celebrating 10,000 units of HL-79 sales, the company showed its latest version, the 791 dockable unit accepting Beta or MII. The HK-322 fully automatic cameras were displayed as were the 323 2/3-inch and one inch triax and multicore field/studio cameras; the 323P is the portable version. CCD cameras were also displayed in three ranges for broadcast, economy or ultra-miniature uses. The company also brought along its HDTV camera, telecine and color monitor, attracting much attention. In addition, there were several products representing the RF line, including portable microwave links in 7 and 13 GHz.
Reader Service #312

IMAGE VIDEO OFFERS AUDIO DA

The ADA-990 from Image Video is a new audio distribution amplifier. It has a two-amplifier-per-card design that makes it ideally suited for use as a stereo pair. If desired, the two amplifiers on the ADA-990 card may be strapped together as one to double the number of outputs; they may also be used as two independent DAs. Each of the two amps has eight balanced splits, plus a balanced direct output capable of driving an additional four output splits.
Reader Service #313

INTELCO OFFERS HAND-HELD DIGITAL TESTER

Comprehensive testing of digital communications equipment is possible with the new Intelco 500 hand-held bit-error-rate analyzer. It operates in synchronous mode for full- or half-duplex links, and in asynchronous mode for full-duplex links, at baud rates of 300 to 19.2K. Measurements include bit errors, block errors, errored seconds, rising transitions and falling transitions. Price is $395, with deliveries in six to eight weeks.
Reader Service #314



INTELLIGENT LIGHT UNVEILS RENDERING ENGINE

Designed to complement the company's turnkey 3D animation workstations, the new RC-10000 render/compute server from Intelligent Light is designed to streamline computer-intensive animation work. The RC-10000 is based on advanced parallel multiprocessor technology that allows it to compute entire animation jobs in a small fraction of the time previously required, according to the company. Its performance is conservatively rated at 60 MIPS, and it can handle multiple floating point units. Advanced rendering features include bump, texture and reflection mapping. alpha channel generation for digital compositing and field-rate rendering. Delivery is promised for the third quarter of this year.
Reader Service #315

JBL/UREI RELEASE NEW PROCESSOR

The 7110 limiter/compressor is the latest addition to the JBL/UREI line of audio signal processing equipment. It features soft-knee compression curves adjustable from 1.5:1 through infinity:1. In addition, the user has complete control over threshold, attack, release time and output level. An automatic preset button engages a program-dependent variable attack and release circuit, and also fixes the compression ratio and peak/average blend controls to critically accepted settings.
Reader Service #316

JVC STRESSES S-VHS

Although JVC brought its MII products, the emphasis was on S-VHS. One of the featured items was the BR-810U editing recorder providing over 400 lines of resolution. Editing functions include jog control as well as variable speed dial search (from still to 10 times normal speed). Other highlights of the machine are separate Y/C input/output connectors, Y/C 629 mode availablility, front panel test points for alignment and a half-loading mechanism to enable reading of the CTL pulses in fast forward and rewind modes.

For editing, the company unveiled the BR-200U camcorder in S-VHS tht offers an audio spec of more than 80 dB S/N.
Reader Service #317

LAIRD CG GOES COMPONENT

Laird's popular CG-7000 character generator now comes in a new model with built-in Y/C encoder. The CG-7000Y/C features very high-resolution characters, ease of operation, wide font selection, built-in sync generator and fully S-VHS-com-

patible Y/C encoding, according to the company. It lists for $2495.
Reader Service #318

LAKE SYSTEMS SELLS ENGINEERING

The company demonstrated its cadcam capabilities in engineering, designing and installing teleproduction facilities.
Reader Service #319

SOLID STATE VHF TRANSMITTER FROM LARCAN

Larcan has introduced a new, all solid state VHF transmitter, the M-Line. Available in 22 and 44 kW power ratings, the units feature the company's TEC-IV stereo-ready exciter, which is fully compatible with all popular TV stereo, SAP and Pro Channel generators. The modular transmitters are highly redundant for excellent reliability, and feature easy maintenance, with most commonly used exciter adjustments accessible on the front panel. Because it is externally diplexed it generates no IM products.
Reader Service #320

LEADER 411 HAS 18 TEST SIGNALS

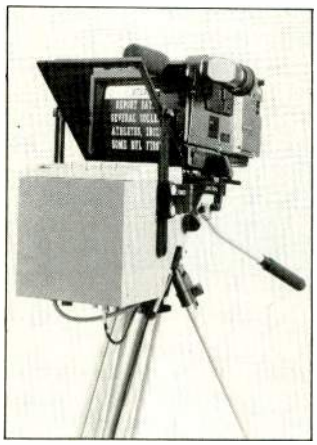
Model 411 is a new NTSC test signal generator from Leader Instruments that synthesizes 18 vital test signals with 10-bit D/A precision. Designed for production and post-production studios, the unit requires just 1.75 in. of rack space and provides test signals free of drift or aging. It has full genlock operation; alternatively, an internal reference yields +/- 2 Hz subcarrier accuracy. The unit costs $4275 and is available now.
Reader Service #321

EFFECTS OPTION FOR LEITCH STILL FILE

A new option for the Leitch Still File still store system allows increased manipulation of stills. Capabilities include a wide choice of transisitions, such as mixes, wipes, mosaics and cuts. A second new option allows "over the shoulder" still presentation, with variable size and position, selectable border and shadow, internal keying over live or still background, and transitions within the compressed area.
Reader Service #322

LEXICON DEBUTS OPUS

The new Opus digital audio workstation from Lexicon combines all important audio production and post-production capabilities in a single unit, performing recording, nondestructive editing, time alignment, mixing and signal processing, all in the digital domain. The user can preview edits, compare takes instantly and work with up to 99 tracks, all with true random access. Opus is configured to mix like a conventional console, with standard faders and level meters. Record/play operations also mimic conventional multitrack recorders.
Reader Service #323

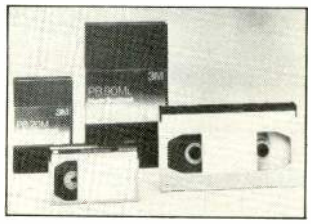


PORTABLE PROMPTER FROM LISTEC

Designed for use with EFP cameras in small studios, Listec's A-2009 portable prompter features a nine-inch monitor with collapsible mirror frame and soft drawstring hood. It weighs only 10 pounds and separates into two components for transportation.
Reader Service #324

LYON LAMB'S VASYSTEMS NOW DELIVERABLE

Lyon Lamb is now delivering its VASystems animation controllers in three versions. VASystem-1 allows RS-170A video to be recorded to a VTR on a frame-by-frame basis, with communication via an RS-232 serial port on the host computer. VASystem-2 adds image capture and storage from either a video camera, VTR or laser disc. VASystem-3 includes all features of 1 and 2, plus video paint capability using onboard TIPS paint software for 2D graphics manipulation. All systems include the Lyon Lamb ENC-VI encoder/sync generator and MiniVAS animation controller.
Reader Service #325



3M DELIVERS NEW TAPE

The company announced the delivery of MII metal tape and the availability of 60- and 90-minute cassettes for Beta SP systems. In addition, the company announced a packout agreement with Otari for the latter's CTM-10 audio cart machines.
Reader Service #326

WHO YA GONNA CALL? 3M FOR SPECTER

3M Broadcasting showed its Specter 3D modeling and animation system, which had been developed by NeoVisuals and shown at SMPTE 1988. The package is hardware-independent and can run on any Sun Microsystem workstation or Silicon Graphics computer including the Iris 3130. It generates 3D polygon or spline patch-modeling, animation, rendering and paint. The user can set antialiasing level to check scenes quickly without going into full-scale rendering.
Reader Service #327

MAGNI INTROS 4:2:2 TRANSCODERS

Magni Systems has introduced the 125AD and 125DA CAV-digital 4:2:2 transcoders, providing switchable eight-bit or 10-bit performance. The units support any current CAV standards at both input and output. Formats include GBR, Beta, MII or SMPTE/EBU. The 125DA transcoder will simultaneously produce correct GBR outputs when the SMPTE/EBU CAV format is chosen. Removal of setup is selectable.
Reader Service #188

MARCONI UNVEILS TV GENERATOR/INSERTER

Marconi's new Model 2926 is a television generator and inserter that provides accurate and stable digitally generated color test signals and waveforms. The unit occupies only two units of rack space and generates both vertical interval test signals and a wide range of full field waveforms,including color bars. A full-field genlock sync pulse generator is included and enables the equipment to be used as a standalone.
Reader Service #189

SERIAL COMMUNICATIONS FROM MATCO

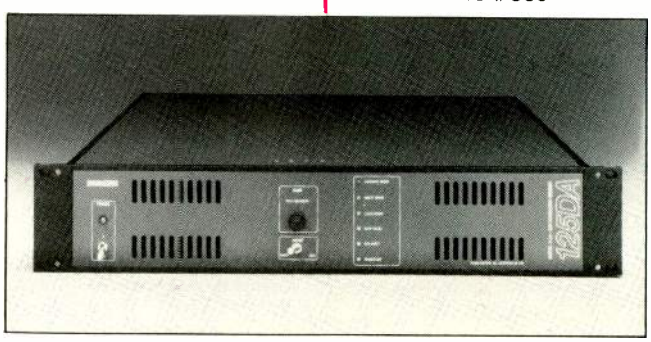
MATCO's new GD-422 adaptor is a microprocessor-based serial-to-parallel machine interface designed to provide RS-422 serial communications to a variety of VCRs.
Reader Service #328

MAXELL COMMITS TO HIGH-END TAPE

At the 1988 NAB Convention, Maxell unveiled two VHS pancakes and a two-inch floppy video disk, as well as DAT and S-VHS products. The new floppy disk, designed for 35 mm cameras, is a magnetic disk with a compact cartridge and ultra-fine metal particle surface that stores up to 50 color images.
Reader Service #329

MCCURDY MOVES TO DIGITAL

McCurdy consolidated its move to sophisticated communications technology with several new digital intercom introductions. More like a sophisticated communications system than a simple intercom, the company's CS9400+ offers advanced software and new features while incorporating some of the hardware from the 9400 system. The system provides complete point-to-point communications, dynamic party lines, interrupted foldbacks, radio interface, telephone interface and two-wire beltpacks.
Reader Service #330



AUTOMATION FOR MEDIA TOUCH

The new Series 2000 from Media Touch is a touchscreen-controlled automation system that interconnects computerized management information, traffic, billing, electronic newsroom and music selector systems. Operations log, copy, newscasts and music schedules are integrated with digital audio mass storage, R-DAT, multitray CD players through RS-232 and RS-422 ports.
Reader Service #331

FOUR FOR MERLIN

Merlin Snell & Wilcox, the new joint venture between Merlin Engineering and Snell and Wilcox, has introduced upgrade capabilities for existing ME-808/9700 and 888/9800 standards converters with four-field store for jitter-free motion interpolation. A new compact converter family, the 8000 series, was highlighted by the ME-8100 entry level standards converter. The 8700 is a triple standard converter with digital image processing.
Reader Service #332

DIVERSITY FROM MICRON

Micron's has introduced the MDS2 a modular, multichannel diversity receiving system. Extended operating range, full monitoring facilities and CNS (Complementary Noise Suppression) are part of the new offering. According to the company, the new diversity receivers provide significant improvement in signal dropout problems.
Reader Service #333

MICROSET LOOPS INTERCOM

The Digicom 50 digital loop intercom was unveiled by Microset. The system operates through a matrix to provide point to point communications. It is housed in a six rack unit card cage that contains the matrix and control circuitry to make up a 50x50 system.
Reader Service #334

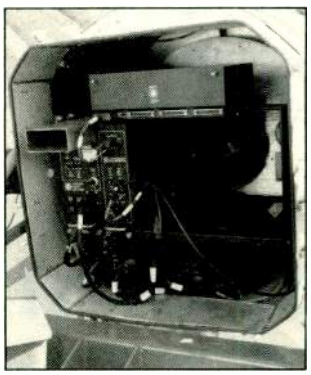
MICROTIME ADVANCES FORMATS

Microtime's new Tx4 combines time base correction with digital effects. Designed to complement S-VHS and other component VTR formats, it features component architecture to ensure transparent processing of VTR playback. For interformat editing or duplication, it offers analog component outputs in addition to the composite and

S-VHS outputs. Full-frame memory provides frame freeze and interpolated field freeze and allows operation with or without advanced sync to the VTR.
Reader Service #335

MIDWEST RATTLES RF WORLD

Midwest has joined with Technalogix to manufacture and market a complete line of high power UHF television transmitters. Various models with power ranges of 30 kW, 60, 120 and 240 kW are available in standard and redundant configurations. Also new from Midwest is the Video



Scamp uplink, which offers either a Vertex 4.6-meter or 6.1-meter Ku-band antenna and houses the uplink electronics in the antenna's hub.
Reader Service #336

MODULATION SCIENCES SOLVES RADIO PROBLEMS

Well known for its stereo systems, DAs and receivers, Modulation Sciences this year demonstrated a new FM, stereo and SCA status check device, the ModMinder. It works off any composite source or FM receiver.
Reader Service #337

MONTAGE PROCESSES PICTURES

The Montage Picture Processor System II is the latest of the company's electronic editing systems. It features upgraded hardware and software for expanded capabilities. Standard equipment includes a built-in switcher and special effects generator, with approximately 20 standard wipes, dissolves and transition effects. Video

preview image is yielded by two time base correctors including master sync generator.
Reader Service #338

MOSELEY RELEASES PC CONTROL

A new PC control terminal option from Moseley provides an AT or compatible computer with serial access to monitor and control the MRC-2 remote control system. The multitasking system automatically stores data to hard disk while other programs are running. The PC control option adds both feedback-oriented and time-oriented functions to the system and is capable of multiple steps with logic branching at many levels to accommodate control and switching of multiple transmitters or antennas.
Reader Service #339

NAGRA ADVANCES CONTROLLER

As a further enhancement to its existing line of audio time code tape recorders, Nagra introduced the TA-Box, a two machine audio/video editing mode controller. It can be placed next to the editor, allowing the operator to select the control of either of the two recorders individually or both together.
Reader Service #340

NEC COMPUTES THE FUTURE

NEC's VSR-10 solid state video recorder, previously seen in prototype, stores and processes video on high-speed

dynamic random access memory. The system accommodates digital effects, graphics and animation teleproduction as well as real-time live broadcast. The speed of processing available in solid state combined with multiple porting of the VSR-10 allows simultaneous performance of many tasks.
Reader Service #341

AUDIO BY PRISM FROM NEVE

Neve's new Prism series of rackmount units, derived from the Neve V Series console, offer the Formant Spectrum Equalizer and a mic amp/dynamics unit that includes a compressor/limiter/gate/expander. The system may be powered from an existing console or by a separate power supply. The DTC-1 digital transfer console provides totally digital stereo mixing and processing chains for the preparation of master tapes.
Reader Service #342

NED BROADENS MARKET

New England Digital has announced a joint venture with Columbine Systems to market the NED Synclavier into the broadcast industry. The company has also introduced the Macintosh II professional graphics workstation for its two main system configurations. The new front end can incorporate two high resolution 19-inch monitors. NED is offering credit toward the purchase of the new workstation to those customers who return their present terminals by September.
Reader Service #343

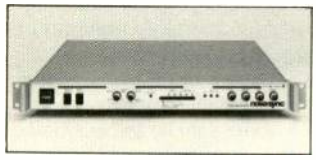
NIKON BREAKS INTO BROADCAST

Nikon has jumped into the broadcast market with both

feet, introducing product covering everything from HDTV lenses to ⅔-inch ENG optics. Most notable are the TV-Nikkoor S15x8.5B and 13x9B using Nikon's extra-low dispersion glass and intended for CCD cameras. The 13x9 weighs in at 2.4 pounds while the 15x is 2.7 pounds.
Reader Service #344

FRAME SYNC FROM NOVA

Nova has unveiled the NovaSync, a $4490 unit that combines frame synchroniza-



tion, auto default, video AGC, input switching, black source, color bars and a processing amplifier in a one RU package.
Reader Service #345

NUMARK PRODUCES DIGITAL VIDEO MIXER

The VAM-2000 digital video/audio mixer from Numark

Circle 145 on Reader Service Card Page 91

integrates into existing systems to eliminate the need for TBCs, according to the manufacturer. It can combine any three video sources with special effects without a TBC, accepting any standard NTSC device. The VAM-2000 can also interface with external titling devices to create customized graphics.
Reader Service #346

NURAD INTROS RF SYSTEMS

Several new products from Nurad include the 230HP2L, a high-performance antenna for use with the 4-Series 23 GHz STL system; a series of quick antenna mounts that eliminate the need for antenna brackets; and a line of compact parabolic antennas featuring the new CP Series for 6.5/7 and 13 GHz, both in 12- and 24-inch versions.
Reader Service #347

OKI CONVERTS

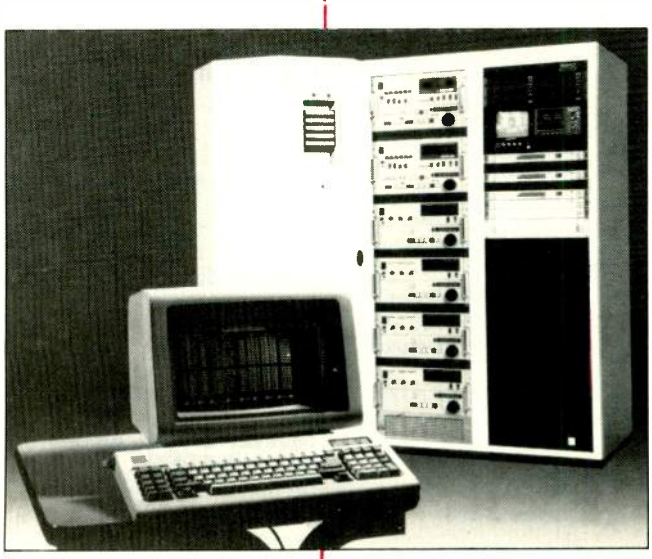
Adding to its line of standards converters, OKI has introduced the LT1210 digital converter. The unit provides four way conversion of PAL, SECAM, NTSC 3.58 and NTSC 4.43 input.
Reader Service #349

DIGITAL DISTRIBUTION BY OMICRON

Omicron Video's new Model 330 is a component digital video distribution amplifier. The system features 10-bit data paths, conforms to the CCIR 601 standard and takes up only one rack space. Modules are accessible from the front for easy maintenance and no cable equalization is necessary up to 150 feet.
Reader Service #350

INSPIRED PROCESSING FROM ORBAN

ORBAN'S new 9105A Optimod-HF processing system is designed specifically for international shortwave broadcast, both conventional AM and SSB, to punch through noise and interference with three to four dB more loudness than Optimod AM. With the Optimod SW speech is highly intelligible as is audibility of music.
Reader Service #351



AUTOMATION BY ODETICS

Odetics has unveiled new station automation interface software running on a video cart machine. The new software for the TCS2000 MII gives the operator more flexibility of control over the cart machines automatic operational routines. Dual screen drivers allow the master control operator continuous viewing of the on-air play list screen, regardless of the screen chosen by the cart machine operator.
Reader Service #348

ORION'S DIGITAL BOARD

Orion's Newsmaker 16/32 digital console features ReMem, which stores, recalls and resets panel setups at the touch of a button. Geared toward newscast usage, it offers perfect continuity of sound in concert with the station's video. Every console setting is remembered, including fader settings, input levels, all signal routing, monitors, and EQ.
Reader Service #352

OTARI STRENGTHENS POSITION

Brand-new from Otari is the MTR-100A multitrack recorder, a digitally controlled, analog 24-track mastering tape recorder. It features fully automated alignment of all record and reproduce parameters including level, bias, HF, MF and LF record EQ, phase compensation, HF and LF repro EQ and repro level. A backlit LCD panel is used for entering audio alignment parameters. Machines are available now and sell for less than $60,000.
Reader Service #353

TRAVELING STUDIOS FOR PACIFIC

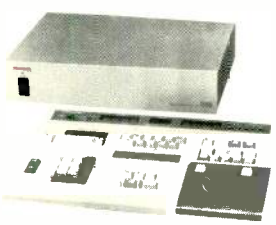
Pacific Recorders and Engineering demonstrated its new, travelling studios. Two individual remote studios and edit stations are able to be wired separately or ganged together, providing independent news production or on-air capability. Designed for Westwood One for the Seoul Olympics, the entire project breaks down into 32 cases for transport.
Reader Service #354

EDITING FROM PALTEX

Paltex featured the E-Series expandable editing systems. The E-Series is comprised of five different systems ranging from the Elite with three serial VTR interfaces through the Elan and ES/P with four serial interfaces, the ES/D with six and the Esprit Plus with eight. The Esprit Plus also offers 2FSC and one audio interface, along with options for digital effects and character generators, up to 16 VTRs and 700 event nonvolatile EDL memory.
Reader Service #355

S-VHS FOR PANASONIC INDUSTRIAL

Panasonic Industrial has unveiled the AG-7500A S-VHS editing VCR with capstan override capability and the AG-800 multi-event controller. The 7500 claims edit accuracy to plus/minus one field, while the A800 can memorize up to 128



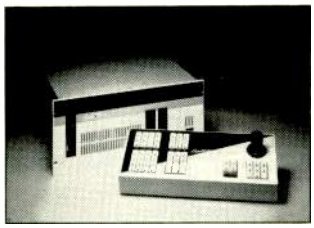
editing events by SMPTE time code for multisource editing. Also new are the AG-7100A, an S-VHS player with external sync for use as a source unit or on-air machine, and a new TBC, Model TBC-200, which offers Y/C 3.58 MHz, Y/629 kHz and composite NTSC signal processing capabilities along with chroma noise reduction, chroma delay correction and enhancement circuitry.
Reader Service #356

PESA GENERATES CHARACTER

A new character generator from Pesa, the CG4711, is a moderately priced unit with downstream keying, encoder and genlockable SPG and is available in the standard unit.
Reader Service #357

PHILIPS MEASURES UP

Philips Test & Measurement has introduced the PM 5640 video test signal generator and the PM 5638 component color coder SPG. The 5640 features sinewave frequencies up to 20 MHz, zone plate signals up to 13.5 MHz and over 150 standard test patterns. The 5638 encodes analog components to composite video, is a standalone for SPG timing and uses RGB and new SMPTE/EBU standards.
Reader Service #358



PINNACLE PUSHES ON

The center of attention at the Pinnacle booth was the System 1000 video workstation incorporating the still store option. The unit allows freeze, store and retrieve more than 100 images on an internal disk. It also permits adding digital effects and transitions to cuts-only editing.
Reader Service #359

RECEIVING PINZONE

Pinzone's VIMCAS encoder/decoder adds extra channels to existing VTRs. It can be used with current mono VTRs and provides each new channel with 14 kHz audio, using three lines each in the vertical interval. A decoder is needed for audio output from a VTR hooked to one of these units.
Reader Service #360

PIXAR SHOWS NEW COMPUTER

Pixar has introduced the Pixar II, an expandable image computer selling for $29,500. It can be configured with up to 108 Mb of memory and comes bundled with the company's software libraries, including the C compiler, all compatible with previous systems. A new Video Merge capability enables users to interactively composite images from two separate frame buffers.

Reader Service #361

PRIME IMAGE COMPONENT TBC

New from Prime Inage is the S Series of true component TBCs, which have Y/C in and out for the S-VHS market. Other S series products include the S Switch, making A/B roll edits possible in the Y/C component mode.

Reader Service #362

QUANTA DEBUTS DELTA 1 AND ORION

Quanta's new Delta 1 and Orion are high-end, antialiased, typographic-quality character generators. The Delta 1 offers an apparent resolution of 4.6 ns, fast rendering during test entry, real-time operation with rendered fonts and text entry at any angle. Texture mapping of characters, borders, shadows and backgrounds is also possible with the Delta 1 system. Powerful hardware incorporates dual frame buffers for preview/air and multi-level effects. The Orion boasts 16 levels of antialiasing, 256 levels of transparency and effective resolution of 5 ns. It features

five standard antialiased face styles in eight sizes each with up to 32 resident fonts.

Reader Service #363

QUANTEL AUTOMATES AUDIO

Quantel, along with its sister company Solid State Logic, has married digital audio and video technologies to produce Harrysound. This system shares pen, tablet and menu control with Harry for integrated audio editing and offers six tracks, random access, cut, crossfade, offset, gain profile and mix. Also new from Quantel is the Ramcorder, a solid state random access video store for retouching rotoscoping and animation work in conjunction with the Paintbox.

Reader Service #364

QSI SHOWS NEWS PROCESSORS

Two new video processing amplifiers, the 5500 and the 5300, have been introduced by QSI. The 5500 offers full sync re-generation/replacement, blackburst out on loss of signal and auto bypass on loss of lock. Also new from QSI are three new SMPTE color bar generators with 8, 16 or 24 character source ID, the 408, 416, 424 respectively.

Reader Service #365

R-COLUMBIA GOES WIRELESS

The new Model TR-50/B base stations from R-Columbia provide full or partial duplex intercommunication between FM wireless stations within 150 yards. The new base station interface operates in the license-free 49 MHz band and will interface 2, 3 or 4 hard wired intercom systems.

Reader Service #366

RANK CINTEL IMPROVES CCD

New for Rank at this show was the CCD-based telecine and the Gallery 2000 Image library linked with a Basys newsroom automation system. The ADS-1C, an advancement to the ADS-1, incorporates the latest generation CCD linear array offering improved performances in black level sensitivity. The Gallery Image Library, a 4:2:2 automated image storage system for archiving, was demonstrated interfaced at the Basys booth to the latter's newsroom automation system.

Reader Service #367

RDS COMPUTERIZED TRAFFIC/BILLING

Showing its complete computerized business systems, RDS demonstrated its interfacing ability to include traffice management reports, billing, accounts receivable and general ledger.

Reader Service #368

REACH FOR PAGING

Demonstrating its VIP II tone/voice pager, Reach Electronics exhibited further uses for a station's SCA channel. The system is based on a microprocessor controlled dial access terminal that is capable of handling up to 2000 pagers.

Reader Service #369

RF TECHNOLOGY ANNOUNCES WIRELESS MIC

The RM-100 Series of wireless mic equipment from RF Technology includes both fixed and portable units. The 950 MHz wireless system is designed specifically with ENG and sports applications in mind, but is small enough for the studio. The RM-100T transmitter provides high RF output power and a battery life typically five hours. There are two receiver options—the RM-101P portable and the RM-101F for rackmounting.

Reader Service #370

ROCKWELL HAS DIGITAL VIDEO

The DVS-1000 digital video distribution system from Rockwell International has full DSX-3 compatible digital input/output signals, RS-250B quality video and two stereo audio channels. It offers standard NTSC video interface with up to four coders and/or decoders per shelf.

Reader Service #371

ROSCOR MOBILIZES VIDEO

Mobile and fixed video and RF installations were exhibited at the show this year with demonstrations including satellite newsgathering vehicles and full-blown mobile production facilities.

Reader Service #372

ROSS VIDEO INTROS NEW SWITCHER

Ross Video's newest production switcher, Model 416, offers 16 inputs and two multi-level effects systems. In addition, it provides four key busses, selection of key priority, independent mask generator on each of the four keyers and six matte generators.

Reader Service #373

RTS INTROS INTERCOM STATION

RTS Systems has a new portable Intercom user station, model BP325. The two-channel unit features enhanced analog performance and microprocessor support for digital switching functions. It has stereo and mono, a microphone limiter circuit for equalizing levels, three headphone amps, and silent channel-select switching. The suggested list price is $340.

Reader Service #374

SAIC BOWS EIDOPHOR HDTV PROJECTOR

Eidophor's high definition color video projection system has been launched here by Science Applications International Corporation. The Eidophor 5177 multi-standard projection system uses the 1125/60 HDTV standard and provides an aspect ratio of 16:9 (theater dimensions). Light output is 3,300 lumens. The system projects up to 40-foot-wide images on regular motion picture screens.

Reader Service #375

LENS TRIO FROM SCHNEIDER

Schneider has unveiled three new lenses—the 14.5x TV wide-angle lens with 2x flip-in extender for 1(l/4)-inch pick-up tubes and the 14.5x wide-angle lens with 2x flip-in extender and diascope. The latter is available for 1 l/4" and 1" types. Also new is the Apo-Varon HM1x zoom lens for 2/3" CCD ENG/EFP cameras. It features apochromatic design and low chromatic aberration.

Reader Service #376

SCALA OFFERS NEW FM MONITORING ANTENNA

Scala's new CL-FMRX antenna is designed for critical FM receive-only applications including off-air monitoring of FM broadcast signals. The antenna is a log-periodic array which covers the complete 88-108 MHz FRM broadcast band. Frequency response is flat and front-to-back and front-to-side ratios are 25 dB (minimum). Suggested list price is $280.

Reader Service #377

SHIVELY OFFERS ANTENNAS DIRECTION

Complete antenna system capabilties were revealed at the show, including FM antennas, FCC directionals, multistations, rigid transmission line, combiners and pattern studies.

Reader Service #378

SHURE INTROS HEAD-WORN CONDENSER MIC

Shure has launched the SM15 head-worn condenser microphone, which offers performance characteristics similar to a hand-held microphone. Featuring a new unidirectional electret condenser cartridge design, the SM15 has a frequency response of 50 to 15,000 Hz and a sound pres-

sure level capacity of 141 dB. Suggested list price is $275.
Reader Service #379

SANKEN INTRODUCES DUAL-CAPSULE MIC

Sanken's new CU-44X is described as the first transformerless microphone to feature a dual-capsule condenser design. The cardioid pattern mic utilizes one-micron titanium diaphragms, which do not corrode and resist changes in temperature and humidity. The dual-capsule design is claimed to maximize handling of high and low frequencies.
Reader Service #380

SCHAFER DEBUTS RADIO AUTOMATION ON VIDEO

The Schafer Digital System allows radio stations to store complete music and commercial libraries on videocassette, delivering random access to every item and instant access to commercials and other short events. Up to 10 hours of music can be stored on a Beta cassette in eight or 16 videocassette recorders. Short events are stored on a VCR and downloaded to a hard disk for instant access.
Reader Service #381

plete monitoring and control of one or more satellite earth stations via simple commands input through the system's computer keyboard. Earth station status is communicated instantaneously. The system includes software, computer, keyboard and video display monitor. A timed-event scheduler provides total automation on a daily, weekly or one-time basis with or without operator verification.
Reader Service #383

NEW TEST GENERATOR FROM SHIBASOKU

ShibaSoku's new TG-7 TV test signal generator series meets all testing requirements in NTSC (RS170A synchronization), PAL and SECAM television systems. They feature composite video and separated Y/C output connectors. The main units can each accommodate up to three test signal generator plug-in units designed to generate single test waveforms for specific measurement applications and can be genlocked to external composite color video.
Reader Service #384

SCHWEM SHOWS NEW MINI IMAGE STABILIZER

Schwem Technology demonstrated a "concept prototype" of its GX-3 mini image stabilizer. Weighing less than 5 pounds including CCD camera, the fully integrated camera/lens system is enclosed in a cylinder 10 inches long and four inches in diameter. The GX-3 was designed for low light level and wide angle capability in a very small size format and features a focal length of 12.5 to 75 mm with a 2x extender, a 1.8/f lens and full remote control.
Reader Service #382

S-A INTROS PC-BASED EARTH STATION CONTROLLER

Scientific-Atlanta's new PC-based earth station control system 7670 provides com-

SHIMATRONIC SHOWS GRAPHIC SYSTEM

Shimatronic's SDS design system is a series of graphic image stations intended for designers, artists and animators. A modular design, the basic system operates on a 32-bit high speed bus. Paint and animation features include 16-million color palette, color ramp function, color match, image overlay and airbrush and water color function. A 3D rendering system using high speed parallel processing systems delivers very rapid ray tracing.
Reader Service #385

SKOTEL BOWS FILM TO TAPE TIME CODE GEN

The new Skotel TCT-80N-FT time code generator features film tachometer interface, 3/2 pull-down recognition and character inserter. The unit functions as a normal time

code generator when the tachometer interface is inhibited. Designed for video production of material originated on film, the 80N-FT identifies source to single frame and permits striping tape from film in LTC and VITC simultaneously. List price is $1755.
Reader Service #386

SOLUTEC BOWS VISUAL AUDIO LEVEL METERS

New from Solutec is the SOL-20/20, which inserts a stereo audio level meter into a video image in the form of three bar graphs. Some alarm detection capabilities are also featured. The SOL-20/20 can be used at master control to monitor off or on-air signals and in post-production. It is available now and lists for $1795.
Reader Service #387

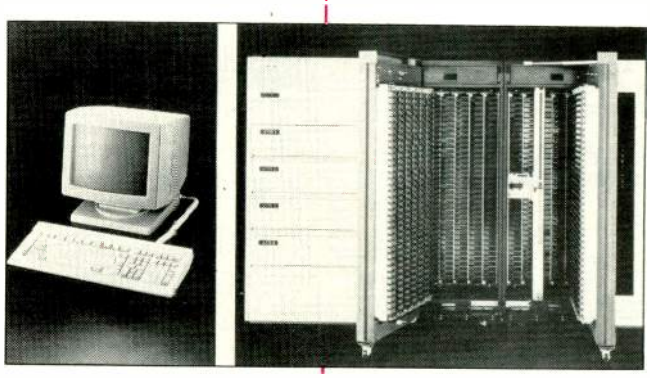
SONY LAUNCHES D-2 COMPOSITE DIGITAL VTR

Sony has introduced the DVR-10, a digital video tape recorder based on the D-2 composite format. Linking existing composite video equipment and digital technology, the DVR-10 maintains transparent signal quality through 20 generations. Video S/N for D-2

machines is 54 dB, compared to Type C standard 49 dB (first generation). The DVR-10 also provides 4 PCM audio channels featuring 16-bit quantization and S/N ratio of 90 dB. The DVR-10 can interface with both analog and digital equipment and component and composite hardware. D-2 cassettes offer up to 94 minutes of run time. The DVR-10 will be available in October 1988.
Reader Service #388

SONY ADVANCES LMS SYSTEMS FOR STATION AUTOMATION

Sony's new Library Management Systems (LMS) are available in versions using Betacam SP (BVC-1000) and composite D-2 digital (DVC-1000S). Standard storage capacity for both versions is approximately 1000 cassettes, and the modular design permits expandability up to 4000 cassetttes. The LMS is designed for management and replay of commercials, spots and program material. Both systems are equipped with four VTRs, expandable to six. In addition, up to four external VTRs may be controlled via an RS-422 interface. The Library Management Systems will be available this summer.
Reader Service #389



SONY ANNOUNCES ONE-PIECE CAMCORDER

Sony's BVW-200 is a one-piece integrated camcorder that weighs under 15 pounds including lens, battery and Betacam SP recorder with tape. The camcorder is 14.6 inches long, with controls dispersed along the camera body. ENG-quality imaging is provided by the 510 interline transfer chip. The VTR and camera systems are integrated into a single PC motherboard, while the camera's microcomputer is linked through a common bus to the three microcomputers within the VTR system. The BVW-200 will be available in August 1988. Suggested list price is $25,000.
Reader Service #390

SONY INTROS TWO-TRACK STUDIO R-DAT RECORDER

Sony has launched the PCM-2500 professional DAT recorder offering spooling up to 180 times normal speed, rapid program search capabilities and a direct interface to both analog and digital audio equip-

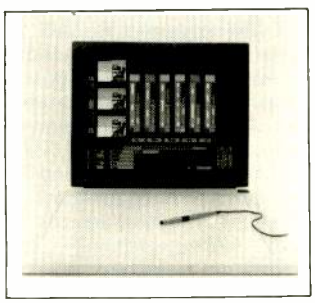
ment. Quantization is 16 bit linear, tape speed is 8.15 mm/sec at fs = 48, recording time is a maximum of 120 minutes and rewind and fast-forward time is approximately 40 seconds (with option). The PCM-2500 is available now. Suggested list price is $4995.
Reader Service #391

SOUNDCRAFT BOWS SAC200 CONSOLE

Soundcraft Electronics has launched the SAC 200 modular console. Designed for on-air broadcast and audio-visual production applications, the SAC 200 provides standard and stereo input modules with a control logic/VCA printed circuit board fitted next to the fader control. A Telco mmodule can provide a mix minus output and reverse talkback facilities. Frame sizes are available for eight-, 16- or 24-input module formats.
Reader Service #392

SSL INTROS HARRYSOUND

Solid State Logic has married digital audio and video technologies to produce Harrysound. This system shares pen, tablet and menu control with Quantel's Harry for integrated audio editing and offers six tracks, random access, cut, crossfade, offset, gain profile and mix. Also new from Quantel is the Ramcorder, a solid state ran-



dom access video store for retouching rotoscoping and animation work in conjunction with the Paintbox.
Reader Service #393

STUDER INTRODUCES PRO CD PLAYER

Studer's new A730 professional CD player allows direct access to track and index, minutes, seconds and frames and elapsed and remaining track time. An autocue feature determines and stores start and end of moculation, while a "disc recognition feature" has dynamic, non-volatile memory for up to 100 CDs. A directly accessible cue memory stores up to three start cue points for each CD. The A730 CD ROM drive also plays three-inch CDs without an adapter. Suggested list price is $3500.
Reader Service #394

SYMBOLICS BOWS HDTV ANIMATION

Symbolics Inc. has announced an HDTV graphics system that offers full 2D and 3D computer animation and paint capabilities in HDTV format. New color controller and genlock cards enable HDTV output to monitors and tape recorders. The Symbolics HDTV format and bandwidth are output compatible with the NHK/Sony HDTV standard of 1125 scan lines with 5:3 aspect ration. The system also supports NTSC, PAL and Film resolution and incorporates a full 32-bit frame buffer with alpha channel for mattes.
Reader Service #395

SYSTEMATION ADDS TOUCHSCREEN

Systemation has added touchscreen capability to its range of broadcast systems. Systemation also supports computer keyboard or joystick control. Systemation programming systems, which include a unique totally random-access automation system, are used in full-automation, satellite and live-assist installations.
Reader Service #396

TDK ADDS S-VHS HALF-INCH VIDEOTAPE

TDK has launched ST-120XP S-VHS videocassettes and STC-20XP S-VHS compact-format videocassettes. Recording times for the two S-VHS cassettes in the SP mode are 60 minutes and 20 minutes respectively.
Reader Service #397

TASCAM LAUNCHES R-DAT STUDIO RECORDER

Tascam has launched the DA 50, an intelligent desktop R-DAT recorder with hard-wired remote control. The unit features twin ADCs with 10-bit dither and twin DACs with 12-bit dither. Specifications include sampling frequencies at 48 kHz (rec/play), 44. Professional broadcast functions include blank search and direct search, cue/review/ music skip, auto rec mute and start ID/skip ID. Suggested list price is $3995.
Reader Service #398

TECHNOV INTRODUCES SYNC PULSE AND COLORBAR GENERATOR

Technov's CSG-300 RS170A can be used as a master house generator or in genlock operations to composite video. It employs a 14.31881 MHz oven-controlled crystal for timing into other sync systems. Housed in a single EIA rack space cabinet the CSG-300 offers sync, blanking, horizontal, vertical, burst flag and subcarrier, NTSC split-field RS170A colorbars and 4 composite blackburst outputs. Suggested list price is $1295.
Reader Service #399

TELEX REVEALS PRO SERIES

The Pro Series of duplicators with 8X speed and improved specifications was highlighted by the company in Las Vegas and featured a 12-month payment plan. Also on hand were the wired and wireless microphones and the audiocom intercom system.
Reader Service #400

TFT INTROS FM BASEBAND MONITOR

TFT Inc. has introduced the 884 FM Baseband Stereo Modulation Monitor. The 884 is frequency agile and incorporates TFT's proprietary peak modulation duration differentiator (PMDD) circuit, which distinguishes modulation peaks from extraneous spikes which trigger false indications of excessive modulation. Price is $3200.
Reader Service #401

THOMSON-LGT HAS NEW TRANSPONDER

This new line of transponders from Thomson-LGT receive vision and sound signals from satellite and retransmit them as terrestrial TV signals. A range of models with power outputs from 0.3 for 100 W allow the coverage of a variety of geographic areas. The equipment is remote controlled and comes in a standard and passive reserve version for higher power ranges.
Reader Service #402

THORN EMI VARIAN WITH UHF KLYSTRON

TEV has announced a high-efficiency S-tuned standard external cavity wideband klystron. Designated the PT5093, it is designed to replace existing 60 kW external klystrons. Efficiency is said to be typically 50 per cent at 64 kW (peak sync) but can rise to 54 per cent. The 470-810 MHz wideband PT5093 is a plug-in replacement for K3672, YK1265 or the TEV standard PT5090. No additional circuitry is required and a retrofit package is available for integral klystron transmitters.
Reader Service #403

TELOS UPGRADES DIGITAL TELEPHONE INTERFACE

Telos announced a second generation Telos 100 hybrid single-line telephone system. Applying digital signal processing technology to the phone-to-air interface, the 100 is intended for newsrooms, production studios or as part of a complete system. The 16-bit system reduces noise and distortion and delivers trans-hybrid loss of 42 dB.
Reader Service #404

TEKTRONIX LAUNCHES DIGITAL TEST GEN

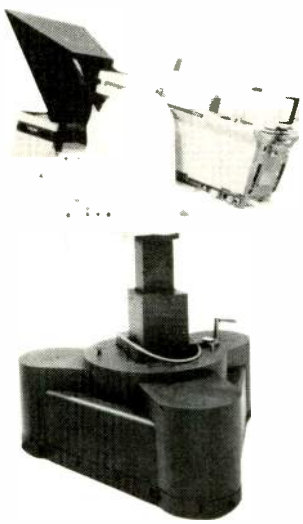
Tektronix's new TSG-170D Digital Composite NTSC Television Generator provides test signals and audio tone in digital and composite form, plus an analog black burst for equipment synchronization. It uses 10-bit digital test signal generation and includes SMPTE bars, convergence, pulse and bar with window, multiburst, five-step luminance staircase and 12 other frequently used test signals.

Reader Service #405

TIMELINE DEBUTS AUDIO POST PRODUCTS

TimeLine has added four new products for audio post production. They include the Lynx Post Production System, a modular machine control system for audio and video tape machines and sprocketed film transports, and the programmable Lynx Keyboard Control Unit. Other parts of the system are the Lynx System Supervisor, which uses a single serial protocol based on the ESbus standard, and the Lynx Film Module, which allows the integration of sprocketed film machines into computerized audio and video editing systems.

Reader Service #406



TSM LAUNCHES CAMERA AUTOMATION

TSM's new AutoCam camera automation system includes two automated pan/tilt heads, a servo pedestal, a touchscreen controller and lens servo drives. Options include Auto Talent Tracking and newsroom computer interface. The system's HS-110P and HS-105P servo drive pan/tilt heads offer 18 and 36 arc/second repeatability. Both have an acceleration of 180 degrees/sec2 and velocity of 90 degrees/second.

Reader Service #407

ULTIMATTE OFFERS MEMORY HEAD

Ultimatte's new Memory Head is a tripod head designed to aid video compositing involving pans, tilts, zooms, and focus pulls. It can be used in both studio and location shooting. It has the feel of a fluid head, but it records each move and stores it on 3½-inch diskette to repeat two minutes of motion on four axes. In this manner, an actor can be shot in the studio, and the moves can be reproduced exactly in shooting the background.

Reader Service #408

UTAH SCIENTIFIC BOWS DIGITAL VIDEO ROUTING SWITCHER

New from Utah Scientific is the DVS-1 Digital Video Routing Switcher, which incorporates a 32 x 16 matrix in a single card frame with expansion to 128 x 128; loop-through inputs; dual outputs and 10-data-bit signal handling.

The design emphasizes reliability and failure modes via redundant power supplies and control cards and the elimination of discrete internal wiring. Control is by standard Utah Scientific control panels or RS-232 or RS-422 ports.

A cooperative design effort with Alpha Image Ltd., Newbury, England, the DVS-1 is available now.

Reader Service #409

UTAH OFFERS TOTAL AUTOMATION

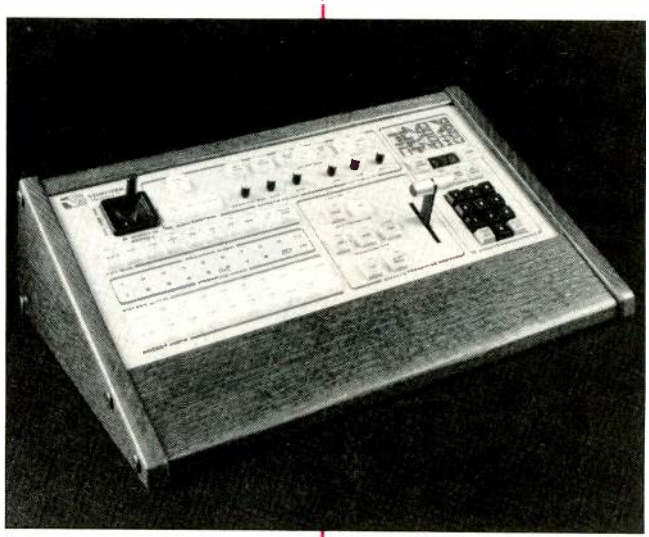
Utah Scientific's new "TAS" Total Automation System provides open architecture to allow easy integration of next-generation, computer-controlled broadcast equipment as well as current "smart" machines. TAS is based on Regulus, a UNIX-like operating system that runs on redundant microprocessors and provides rapid processing speed and multi-task operation. Features include fully integrated automation from traffic system to on-air; unlimited interface capacity; automated spot reel generation and playback; frame-accurate interactive parking and cueing of machines and multichannel/multistation operation capability.

Reader Service #410

VIDEO INTERNATIONAL HAS DIGITAL CONVERTER/TBC

Video International brought its DTC 4500 unit for digital conversion of TV video signals. It adheres to the EBU 4:2:2 standard, offers noise reduction, and four-field movement interpolation. It converts with four-field interpolation at a differential gain of two percent.

Reader Service #411



VIDEOTEK DEBUTS THE PRODIGY

Videotek's new Prodigy is a powerful production switcher in a small package. It offers multilevel effects with preview and 100-event memory as well as stereo AFV. Three RS-422 ports link to edit controllers and other devices. Prodigy has eight video inputs, plus black and color background, 24 wipe patterns, and can recall 80 transitions, 10 instant replays, and 10 sequences. Its standard sync regenarator genlocks to a blackburst signal to simplify systems installations. It has a list of $9995 and can be either rackmounted or put in a console.

Reader Service #412

VIDEOMEDIA INTROS V-MAX

The V-Max series of editing systems is a modular approach to high-end editing and post-production. It is based on the V-LAN system and is used by manufacturers for machine control. It can handle any reciever within the V-LAN protocol. V-Max is available in three models, all are upgradeable. It can contol up to 32 devices (16 can be VTRs), and has a 250-event memory.

Reader Service #413

VINTEN LAUNCHES NEW VISION 5

W. Vinten Ltd. has introduced a new Vision 5 pan and tilt head for use with smaller ENG and new generation CCD cameras. The Vision 5 fits the 100 mm bowl fixing of Vision's single-stage and two-stage tripods, weighs six pounds and provides a tilt range of 75 degrees backwards and 85 degrees forwards.

Reader Service #414

VTE LAUNCHES GRAPHICS INTERFACE

VTE has developed the VME interface board to link graphics workstations and digital post-production studios. It features one digital video input and two outputs that comply with CCIR 601/SMPTE 125 studio and TV standards with digital 4:2:2 sampling. The interface comes with a memory-mapping framestore memory.

Reader Service #415

WARD-BECK INTROS NEW RADIO CONSOLE

Ward-Beck Systems' new RP2200 radio production console provides in-line equalization (both mono and stereo) and multitrack interfacing to the existing WBS product line. Like Ward-Beck's full radio console line, the RP2200 offers features designed espe-

cially for radio, such as Penny & Giles faders, stereo mode switching, Mix-minus busing, and dual redundant power supplies.
Reader Service #416

WAVEFRAME ADDS DIGITAL PROCESSOR

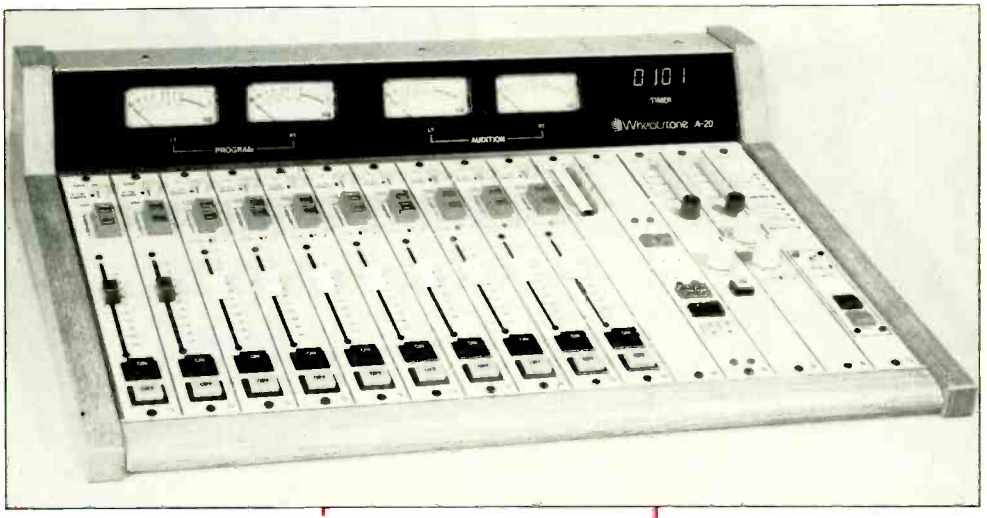
Waveframe has launched a Digital Signal Processor (DSP) module compatible with its AudioFrame Digital Audio Workstation. This general-purpose engine occupies a single slot in the AudioFrame digital audio rack and connects directly to the AudioFrame digital audio bus. The user-programmable module can be software-configured to perform 24-bit digital mixing with EQ, pan and gain; 24-bit digital effects including reverb and delay; physical sound modeling synthesis and combinations of the above. Suggested list price for the DSP Module is $10,000. It is available now.
Reader Service #417

WAVEFRONT ADDS DIGITAL FIELD RENDERING, RECORDING

Wavefront has upgraded its 3D animation software with digital field rendering and recording. It now provides high quality image composition and motion with rendering speeds of 60 frames a second, twice the industry norm for a software based system. The animation system supports CCIR 601-compatible file formats. The company has also announced that its animation software will now run on Ardent Computer Corp's Titan graphics supercomputer. Wavefront has also added a matte channel with RGB ouput to digital devices.
Reader Service #418

WEGENER INTROS ADDRESSABLE DATA RECEIVER

Wegener's new Series 1800 Broadcast Audio and Data Receiver works with subcarriers above video or Wegener's FM 2 broadcast transmission formats in C or Ku band networks. The addressable receiver offers remote transponder selection, remote tuning of subcarrier frequency, remote authorization or de-authorization and multiple channels of data and/or high quality audio. Additional features include remote access to network control, voice or data messaging and scheduling.
Reader Service #419



WHEATSTONE UNVEILS RADIO CONSOLE

Wheatstone's new A-20 on-air broadcast console features modular construction, a fully regulated rackmount power supply, logic follow, full machine control and an all-gold contact interface system. It has two mic channels and eight stereo line channels, each with A/B source select and program/audition bus assign, plus cue switches on the line modules. Standard features include program and audition VU meters, digital timer and a monitor module for control room and headphone functions. The standard console lists for $8900.
Reader Service #420

WINSTED ADDS RACK SLIDE KIT

Winsted announced the F8526 rack slide mounting kit for use with Sony BVU-950 VTRs. Designed to facilitate servicing heavy electronics systems, all Winstead rack mount kits feature full-suspension ball bearing slides, steel brackets and new adjustable finger brackets which enable rack mounting in any position.

Shipping weight is 9 pounds. Suggested list price is $235.99.
Reader Service #421

WIREWORKS DISPLAYS CABLES

The full line of high performance cabling products was exhibited at this years convention.
Reader Service #422

WSI DEBUTS ASTRODATA

Astrodata, new from WSI, is a PC-based system that automatically receives, sorts and stores a user-specified, real-time weather database transmitted via satellite broadcast. The data is available instantly for printing or viewing on-screen. Features include an audible weather warning system that alerts weathercasters the National Weather Service has issued a severe weather warning, user-specified data archiving and automatic data printing.
Reader Service #423

YAMAHA BOWS DIGITAL EQUALIZER

Yamaha's DEQ7 is a dual-channel digital equalizer/filter system featuring 44.1 kHz sampling and 16-bit conversion with 32-bit internal processing. Thirty filter configurations include full graphic EQ and parametric EQ configurations and shelving, notch and dynamic/sweep filters. Program recall and bulk dump capability is accessible via MIDI. Digital I/O permits "converterless" operation in Yamaha digital audio systems. The selectable presets allow operators to match previous settings and performance "sound" from show-to-show easily. List price is $1395.
Reader Service #424

Common Metric Conversions

By Ronald F. Balonis

More than a decade ago, the FCC adopted a policy for the "Metrication of the Rules and Regulations." Now, in addition to everything else, you've got to think and calculate in metric too. Fortunately this is a task where a PC can be put to work.

CONVERT.BAS is a utility program for 'Conversion Between Units' for some of the common units and quantities used in broadcast engineering calculations.

The program is not comprehensive—there are simply too many conversions required for that. Therefore it won't replace a "Harris Conversion Chart" (available from Harris Corporation, Broadcast Division, Box 4290, Quincy, IL 62305-4290). But it will put some of them in your PCs In Engineering computer toolbox.

The program does a total of 41 reciprocal unit conversions: mostly to/from metric along with some for decibel, temperature and geographic coordinate notation.

Metrics is supposed to simplify numeric operations. A problem with it for broadcasting, however, shows up in the conversion and calculation of distances and bearings. The geological land surveys (topographical maps) are based, and have been since 1893, on a U.S. yard equal to 3600/3937 m. Using the new international meter conversion factor of 0.9144 m [exactly] makes distances shorter by two parts per million. Ordinarily, this would be a trifle of a difference; but in practice, it, and rounding to the nearest kilometer, can mean distances differing by a whole kilometer.

The difficulty this presents depends on the conversion factors used and their "digital significance." The one to use—1.6 miles/km, 1.609 miles/km, or 1.609344 miles/km—depends on the digital significance of the value of the units to be converted, a factor expressing the number of digits that are necessary to define a specific value or quantity.

For example, 150 meters, measured to the nearest meter, has three significant digits; measured to the nearest .1 meter (centimeter), it might be 150.5 meters, with four significant digits.

For absolute accuracy, conversion must maintain in the converted value the measured value's implied or actual measurement accuracy—that is, the same number of significant digits. A greater number or a lesser number of significant digits in either can alter the accuracy of the converted value.

The U.S. adopted the international yard and pound on July 1, 1959. The international Yard equals exactly 0.9144 meter; the international pound equals exactly 0.45359237 kilogram; and, the [international inch equals exactly 2.54 millimeters.

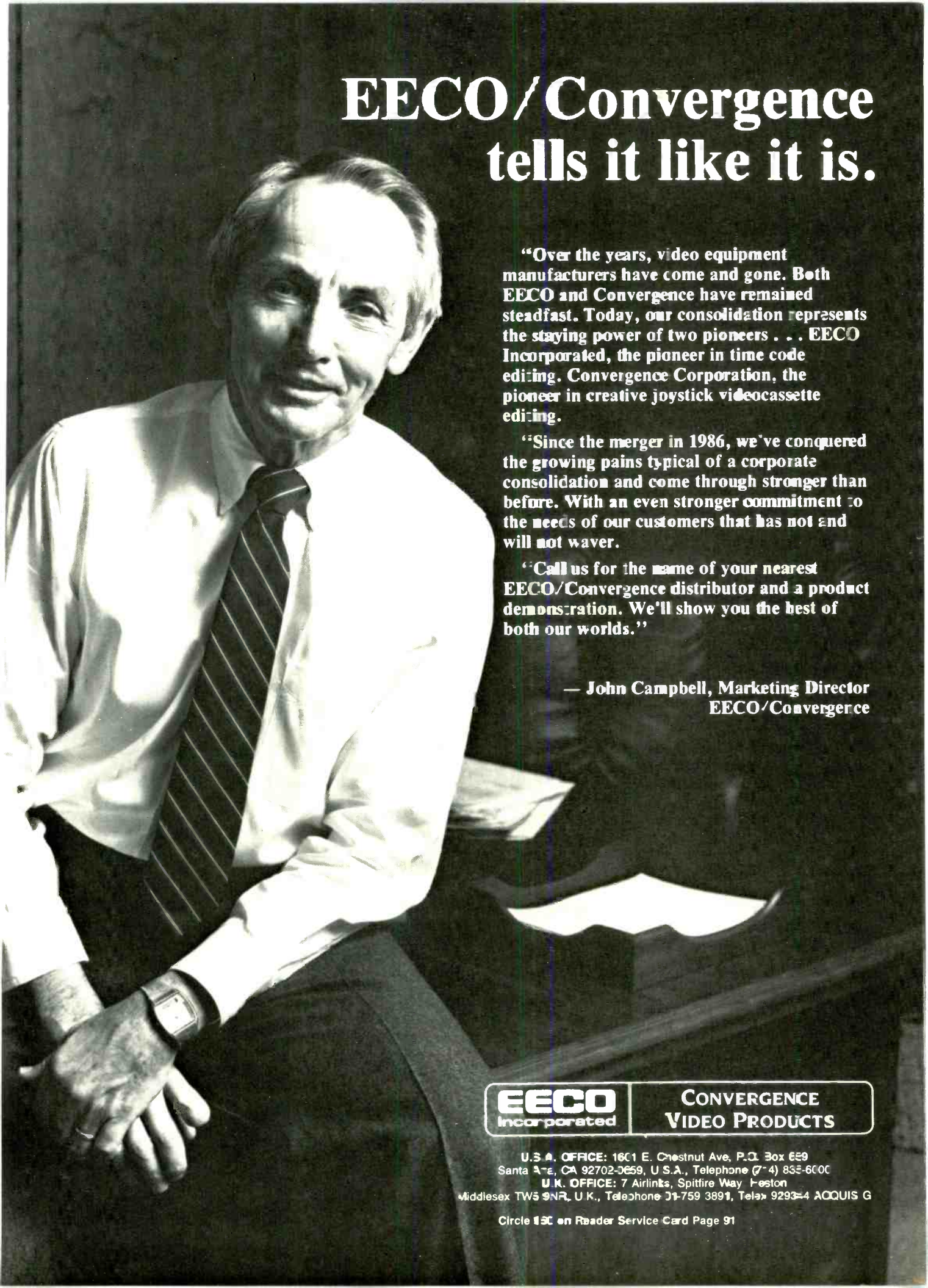
For most consumers and businesses, compliance to the new standards, on a voluntary basis, has been slow. It was not, however, voluntary for agencies of the federal government. The FCC responded by adopting a policy on July 28, 1976 for

```
                    -- Convert Between Units --

IN=CM FT=M MI=KM FEET=INCHES IN2=CM2 FT2=M2 MI2=KM2 SQFEET=ACRE IN3=CM3 FT3=YD3
OZ=G LB=KG GAL=LITERS EI=DBEI PWR=DBPWR KW=DBK WATTS=DBM MV/M=DBU  DDMMSS=DD.DD
DDMM.MM=DD.DD F=C

ENTER <####XX> : 5 M
= 16.40419 FT
ENTER <####XX> : 70 DBU
= 3.16227 MV/M
ENTER <####XX> : 453030 DDMMSS
= 45.50833 DD.DD
ENTER <####XX> : 5 MI
= 8.0467 KM
ENTER <####XX> : 5 LB
= 2.26796 KG
ENTER <####XX> :
```

Figure 1: demo screen for CONVERT.BAS



EECO/Convergence tells it like it is.

"Over the years, video equipment manufacturers have come and gone. Both EECO and Convergence have remained steadfast. Today, our consolidation represents the staying power of two pioneers . . . EECO Incorporated, the pioneer in time code editing. Convergence Corporation, the pioneer in creative joystick videocassette editing.

"Since the merger in 1986, we've conquered the growing pains typical of a corporate consolidation and come through stronger than before. With an even stronger commitment to the needs of our customers that has not and will not waver.

"Call us for the name of your nearest EECO/Convergence distributor and a product demonstration. We'll show you the best of both our worlds."

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Circle 130 on Reader Service Card Page 91

the conversion of the Rules and Regulations to metric units. The process was gradual and deliberate, spanning a dozen years and a number of timely rulemakings.

Even so, it's going to take some time before it will be easy to think in metric. For most, it'll be the mixing of the two systems in thinking with conversion factors.

The Data statements of lines 31 to 39 contain the conversion factors. After keying-in the program up to line 90, run it to check for errors, compare it with the demo screen, and compare the CKSUM to line 65's value: enter PRINT CKSUM.

In lines 70, 170, 175 and 180, the logic function (J/2 = INT(J/2) is used to make selections; in line 70 to determine whether a space or a = prints on the screen; in line 170 and 175 to determine the direction of the log conversion; and, in line 180, to get the compliment of the conversion units. The function, depending on the results of the relationship (J is even or odd), has the logical true/false value of -1 or 0 which can be used in a calculation.

Lines 170 and 175 do the decibel conversions. There's an explanation for the odd coding of the standard decibel formulas for power and voltage: The LOG function in most PCs is the natural Log (to the base 2.718). Decibel calculations require calculations using logs to the base 10. A number is equal to a base raised to its logarithm. Therefore to find the log of a number to the base 10 on a PC, you divide the natural log of the number by the natural log of 10.

Lines 100 to 140 prompt for input of a number followed by a conversion unit and separate the number (I) from the unit (I$). Lines 150 to 465 select and do the conversions. And, line 490 prints the conversion with five significant digits.

As with all and any Basic computer programs that you key in from a magazine listing, it is important to follow the examples in the demo screen first to proof out your version of the program. The examples shown were done using the same program listing in Figure 2, and every effort has been made to ensure that it will work for you, if it's keyed in properly.

Using the program is simple. Follow the examples of the demo screen to proof out your copy of the program. To use it, just type in the number and the units, one from the list on the screen, and press enter. If it can do the calculation, the computer displays the conversion; if not, it displays the prompt again. Enter a 0 to restart the program (to clear the screen after a number of conversions). A null enter terminates the program.■

Balonis is chief engineer at WILK-AM, Wilkes-Barre, PA.

```
0  'CONVERT.BAS * CONVERT BETWEEN UNITS *
5 'BY Ronald F. Balonis          3/14/88
10 '
15 N=26:M=36:'--N=SIMPLE M=N+COMPLEX 44 IN ALL
20 DIM U$(M),K(M),L(M):X$(0)=" ":X$(1)="="
30 '----------DATA CONVERSION CONSTANTS
31 DATA IN,    2.54    ,0 ,CM,     0.3937 ,0 ,FT,     0.304800,0 ,M,      3.280839,0
32 DATA MI,    1.60934,0 ,KM,     0.62137,0 ,FEET, 12.0      ,0 ,INCHES,8.333E-2,0
33 DATA IN2,   6.45161,0 ,CM2,    0.1550 ,0 ,FT2,    0.092903,0 ,M2,    10.763915,0
34 DATA MI2,   2.590   ,0 ,KM2,    0.3861 ,0 ,SQFEET,2.296E-5,0 ,ACRE,   4.356E+4,0
35 DATA IN3, 16.387   ,0 ,CM3,    0.06102,0 ,FT3,    0.37037 ,0 ,YD3,   27.0      ,0
36 DATA OZ,   28.3495 ,0 ,G,      0.03527,0 ,LB,     0.453592,0 ,KG,     2.204622,0
37 DATA GAL,   3.78544,0 ,LITERS,0.26417,0 ,EI,     1.0      ,20,DBEI,  1.0      ,20
38 DATA PWR,   1.0     ,10,DBPWR, 1.0     ,10,KW,     1.0      ,10,DBK,   1.0      ,10
39 DATA WATTS,1E+3    ,10,DBM,    1E+3    ,10,MV/M,   1E+3     ,20,DBU,   1E+3     ,20
40 '
50 CLS:PRINT TAB(26);"-- Convert Between Units --"
55 PRINT
60 FOR I=1 TO M:'------DISPLAY THE CONVERSIONS IT CAN DO
65  READ U$(I), K(I), L(I):CKSUM=CKSUM+K(I)+L(I):' CKSUM=47826.19
70  PRINT U$(I);X$(1+(I/2=INT(I/2)));
75 NEXT I
80 PRINT"DDMMSS=DD.DD ";"DDMM.MM=DD.DD F=C":PRINT
90 '
100 I$="":I=0:U$="":BEEP:'-MAKE A NOISE
105 PRINT"ENTER <####XX> : ";:INPUT I$
110 IF I$="" THEN STOP:'------OR SYSTEM
115  I=VAL(I$):K=0:L=LEN(I$)
120  FOR J=1 TO L
125   IF MID$(I$,J,1)>="A" AND MID$(I$,J,1)<="Z" THEN K=J:J=L
130  NEXT J:
135  IF I=0 AND K=0 THEN RUN:'--RUN TO CLEAR SCREEN
140   I$=RIGHT$(I$,J-K):IF J-K=L THEN 100
145 '
150 FOR J=1 TO M:'----------DATA CONVERSIONS
155  IF I$<>U$(J) THEN 185:'---NO CONVERSION
160   IF J<N+1 THEN:I=I*K(J):GOTO 180
165 '--ELSE ------- POWER, FIELD, OR DB
170   IF J/2<>INT(J/2) THEN I=L(J)*LOG(I*K(J))/LOG(10)
175   IF J/2= INT(J/2) THEN I=EXP(I/L(J)*LOG(10))/K(J)
180    U$=U$(J+1+(J/2=INT(J/2))*2):J=M
185 NEXT J
190 '
200 '----------------FAHRENHEIT=CELSIUS
205 IF I$="F" THEN U$="C":I=(I-32)*5/9
210 IF I$="C" THEN U$="F":I=(I*9/5)+32
295 '
400 '------------LADITUDE AND LONGITUDE
405 IF I$="DDMMSS" THEN GOSUB 420:GOSUB 420
410 IF I$="DDMM.MM" THEN GOSUB 420
415  GOTO 450
420  II=I-INT(I/100)*100:I=INT(I/100)+II/60:U$="DD.DD":RETURN
450 IF I$<>"DD.DD" THEN 480
460  II=I-INT(I):I=INT(I)*100+II*60:U$="DDMMSS"
465  II=I-INT(I):I=INT(I)*100+INT(II*60)
470 '
480 IF U$="" THEN 100:'----RESTART ON ENTRY ERRORS-----
490 PRINT "=";INT(I*10^5)/10^5;U$: GOTO 100
500 '--------END OF THE PROGRAM--------
```

Figure 2: program listing for CONVERT.BAS, a metric unit conversion program.

Low-Power FM

By Harry Cole

Some things just never seem to go away. You can try to ignore them. And so it is with the various proposals to expand the FM translator service in ways that could distort that service far beyond its original purpose. Despite repeated indications that the Commission was not inclined to undertake a significant revamping of the translator service, the idea hung on and eventually acquiring at least an apparent "public interest." And so it is that the broadcast industry may still face the possibility of some form of low-power FM service in the next couple of years.

If you are located in an area that does not have an abundance of translators, some threshold explanation may be appropriate. The FM Translator Service was instituted almost 20 years ago in an effort to supplement the primary service already provided by full-service FM stations. Under the original design translator stations were permitted to retransmit, on a different frequency and at extremely low power (1 to 10 watts), the over-the-air signal of a full-service station. Licensees of commercial FM stations can acquire translators for their own stations, although certain limitations have been placed on their ability to extend their service areas through the use of translators.

Nevertheless, both commercial and noncommercial translators have historically been restricted to rebroadcasting over-the-air signals. That is, the only programming which a translator could use had to be received by it over-the-air from another broadcast station. As a corollary to this, translators were prohibited from originating any programming at all. That restriction has since been loosened somewhat to permit the origination of one 30-second announcement per hour to acknowledge contributions toward the translator's operating expenses. Notwithstanding this relaxation, though, all FM translators are required to operate as nonprofit broadcasting entities.

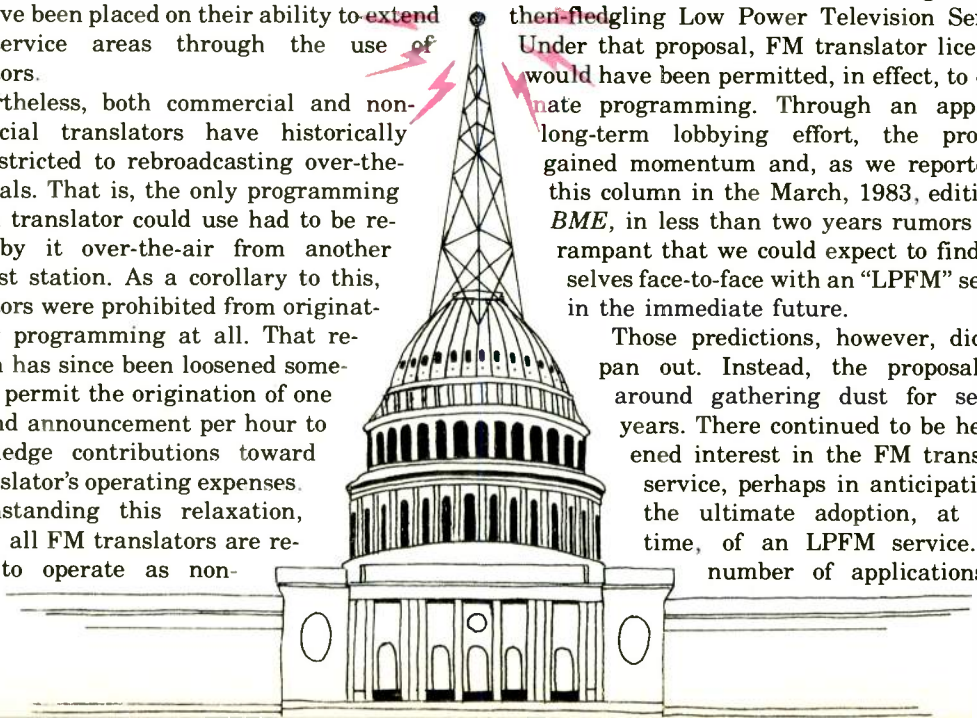
One further important restriction imposed on commercial and noncommercial translators alike is the fact that all translator service is deemed a "secondary" service. This means that, if a translator interferes with an existing or proposed full-service station, the translator must cease operation, regardless of how long the translator may have already been in operation.

The whole idea of translator service has been to provide access to over-the-air signals to areas which, because of topography and/or limited population, would not otherwise have such access. Since translators were limited to the rebroadcasting of over-the-air signals, the programming that would be received by translator audiences would be at least quasi-local in nature.

Cole is a partner in the Washington, DC-based law firm Bechtel & Cole, BME's FCC Counsel.

In May, 1981, an enterprising noncommercial religious licensee advanced a proposal that, in the eyes of many observers, was likely to lead to an FM analogue to the then-fledgling Low Power Television Service. Under that proposal, FM translator licensees would have been permitted, in effect, to originate programming. Through an apparent long-term lobbying effort, the proposal gained momentum and, as we reported in this column in the March, 1983, edition of *BME*, in less than two years rumors were rampant that we could expect to find ourselves face-to-face with an "LPFM" service in the immediate future.

Those predictions, however, did not pan out. Instead, the proposal lay around gathering dust for several years. There continued to be heightened interest in the FM translator service, perhaps in anticipation of the ultimate adoption, at some time, of an LPFM service. The number of applications for



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new FM translators increased substantially during the early to mid-1980s, amidst various charges and countercharges that applicants were warehousing the frequencies for future use. But despite this jockeying around, the Commission itself steadfastly declined to alter the regulatory structure governing FM translators.

That is, until now. In April, 1988, the Commission made some significant changes in the translator system, and indicated that it may be prepared to make even more sweeping changes in the near future.

All the Commission did was to relax the restrictions governing the source of the main signal to be rebroadcast by noncommercial translator licensees whose translators operate on channels reserved for noncommercial operation (*i.e.*, Channels 200-220), and who are themselves the licensees of the primary station rebroadcast on the translator. Under the new rules, such a licensee may utilize terrestrial microwave facilities, satellites, or any delivery system.

In addition, the Commission proposed that these changes be extended further to noncommercial translator licensees (on Channels 200-220) who do not happen to be the licensees of the primary station they are rebroadcasting. Comments and reply comments on this proposal are scheduled (as of this writing) to be filed in June, and Commission action could come by the Fall.

And over and above all of this, the Commission also initiated an inquiry into what overall role the FM translator service can and should play in the greater scheme of U.S. broadcast service. At the same time that it initiated this inquiry, the Commission also imposed a general "freeze" on the acceptance of new translator applications—as a result, the only FM translator applications which may be filed now are those for noncommercial operations on Channels 200-220.

The effects that these changes and proposed changes might have on the FM industry generally are substantial. The most obvious likely effect of the one change which the Commission has already made is that a noncommercial licensee with a single station anywhere in the U.S. may now effectively establish its own nationwide network of FM translator stations. The translators will have to operate on reserved channels and will have to "rebroadcast" the licensee's primary station.

Further, it is difficult to perceive how the Commission can now rationally prohibit program origination by translators. When translators were limited to a purely supplemental role of filling in holes or extending to some modest degree the primary station's coverage area, it made sense to preclude origination as inconsistent with that role. Now, however, it is clear that translators are becoming not just supplemental signal extenders, but alternative programming delivery systems.

The very narrow nature of the changes actually adopted, as opposed to the changes proposed, is particularly curious. If noncommercial translators can properly be fed by satellite, why restrict the right to use such distribution techniques solely to those who wish to extend their own programming? For example, one of the most extensive satellite distribution systems already available and in place is that of National Public Radio, which provides noncommercial programming for public stations nationwide. If a remote community wishes to receive NPR programming but cannot, for whatever reason, support a full-service station, why should that community not be able to take advantage of the translator service now, in the same way as the existing licensee seeking to expand its coverage?

And what of the commercial translator service? By issuing a notice of inquiry (rather than a notice of proposed rule-making) with respect to commercial translators, the Commission has added months, if not years, to the ultimate resolution of the commercial side of things. But if the changes which have already been adopted or proposed for the noncommercial side of things are such good ideas, why not implement them in the same timeframe on the commercial side as well? Why not at least treat the commerical and noncommercial equally?

By taking the steps which it has taken, the FCC may have been trying to please everybody while offending nobody (or at least as few parties as possible). By putting any consideration of commercial translators on a slow track, the Commission has doubtless pleased the powerful commercial broadcast industry. By immediately permitting existing noncommercial licensees to establish their own nationwide networks, the Commission has doubtless pleased, among others, the religious broadcasters.

Importantly, the FCC has performed this tightrope trick during an election year. One must not lose sight of the fact that the Commission is an inherently political organization led by political appointees. With general elections approaching, the threat of antagonizing one or another powerful lobby may have been a strong contributing force to the Commission's approach to the translator service. ■

BUSINESS BRIEFS

News from the recent NAB would indicate that the Las Vegas show was a resounding success for many manufacturers. **Wheatstone Corp.** reported a strong response, with several orders for its A-20, A-500, and SP-6 consoles logged on the floor. In addition, Wheatstone has won a major contract with Jacor Communications' stations WLW/WEBN in Cincinnati, OH. Each station will be furnished with three consoles: 22-channel A-500a's for on-air; 14-channel A-500a's in the news studios; and SP-6s in master production.

Rupert Neve, Inc., is also celebrating. The company's Neve DTC digital transfer console was officially a year old this spring, and several new sales of the V Series product line have been logged: consoles are now in operation at Conway Studios, Westlake Audio, Cherokee Studios, The Record Plant, and several other West Coast facilities, and New York's Tape House has installed its third Series V audio post-production console.

Contrary to our report in April *BME* ("New Ideas in Production Switching," p. 73), **Central Dynamics** is alive and well. The company is operating as a division of International Datacasting Corp., Ottawa, ON, a specialist in software and telemetry equipment.

From one show to another: **WaveFrame Corp.**'s AudioFrame digital audio workstation was in the spotlight at a recent spring trade show besides the NAB. WaveFrame units figured heavily into two events at the recent **Comdex** personal computer show in Atlanta. Musician Roger Powell utilized a WaveFrame interfaced with an Amiga PC at Commodore's annual Comdex celebration and at a fete sponsored by *PC Magazine*...**Scientific-Atlanta** has announced the signing of a contract valued at $17.5 million for the expansion of Indonesia's domestic satellite network. Earth station equipment for 26 sites, including the addition of 16 new major earth station sites, are called for in the contract. In addition, Scientific-Atlanta has formed an alliance with **Comtel**, who will supply the new sites with time division multiple access (TDMA) terminals.

Harris Corp. has posted a 13 percent net income increase in the third quarter of this year (up to $24.7 million compared to last year's $21.9 million). Earnings per share rose 17 percent, from last year's $.53 figure to $.62. Sales jumped to $524.7 million for the year...**Zenith Corp.** has reported first-quarter 1988 earnings of $0.4 million, or $.01 per share, compared with last year's $1 million/$.04 per share figures. Sales were up 5 percent from $547 to $574 million. ■

Utilizing 3M's Snap Cap videocassette hanger system has translated into saved revenues and space, as well as added efficiency for WABC-TV, New York's ABC affiliate, according to director of engineering James Baker. The station currently uses the system in its 20,000 piece ad tape library and has been incorporated on all its transportation carts also. Prompted by WABC's gradual switch from two-inch to half-inch Beta format tape, Baker's decision to go with the Snap Caps hinged on the system's modular approach: "It allowed us to build our new half-inch library without disrupting the existing two-inch setup."

The Snap Cap system stores half-inch cassettes on a hanging removable protective cap. The cap, in turn, is hung on an aluminum bar, thus allowing the construction of a library bar by bar or tape by tape.

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D-2 in the Production Facility

By James J. Bartel

1988 marks the introduction of the first composite digital VTR. In a time when television professionals have several choices of videotape formats, where does the D-2 DVTR fit into a modern teleproduction facility?

Since its inception, D-2 has been wrapped in controversy. D-1, which records the video signal digitally in its component form (R/G/B or Y/R-Y/B-Y), was the first DVTR to gain acceptance by SMPTE and is the first video recording format to be accepted as a worldwide standard. Engineers enthusiastic about keeping the video signal in its component form from camera through production now had their VTR. Why then do we need a second digital video recording format?

D-2, the nineteenth addition to our list of videotape formats, fits the need for a higher quality, but still cost-effective storage medium. D-1 is a very high-quality tape system but it requires a facility to absorb the expense of component signal handling and processing.

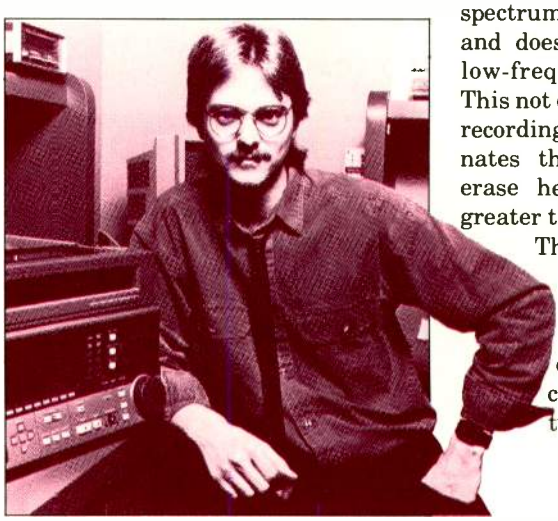
The improvement in image quality that D-2 offers is dramatic compared to analog recording. Its signal-to-noise ratio is low and its spectrum is flat. Type C VTR noise increases as a function of frequency. This makes noise in chroma more apparent. Type C specifies an FM carrier be modulated by the video signal that is to be recorded. The carrier frequency causes the total video bandwidth to be limited to 4.5 MHz, thus minimizing objectionable beating (moiré).

D-2 has no such limitation. This enables the video bandwidth to be increased to 6 MHz, with no moiré. Audio quality is equally impressive. There are four channels of digital audio. They conform to the AES standard, 48 RHz/16-bit processing and are expandable to 20-bit in the future. The audio quality far surpasses analog audio on conventional one-inch videotape and is technically better than CD. These signal enhancements, along with powerful error correction schemes, make for excellent multi-generational quality.

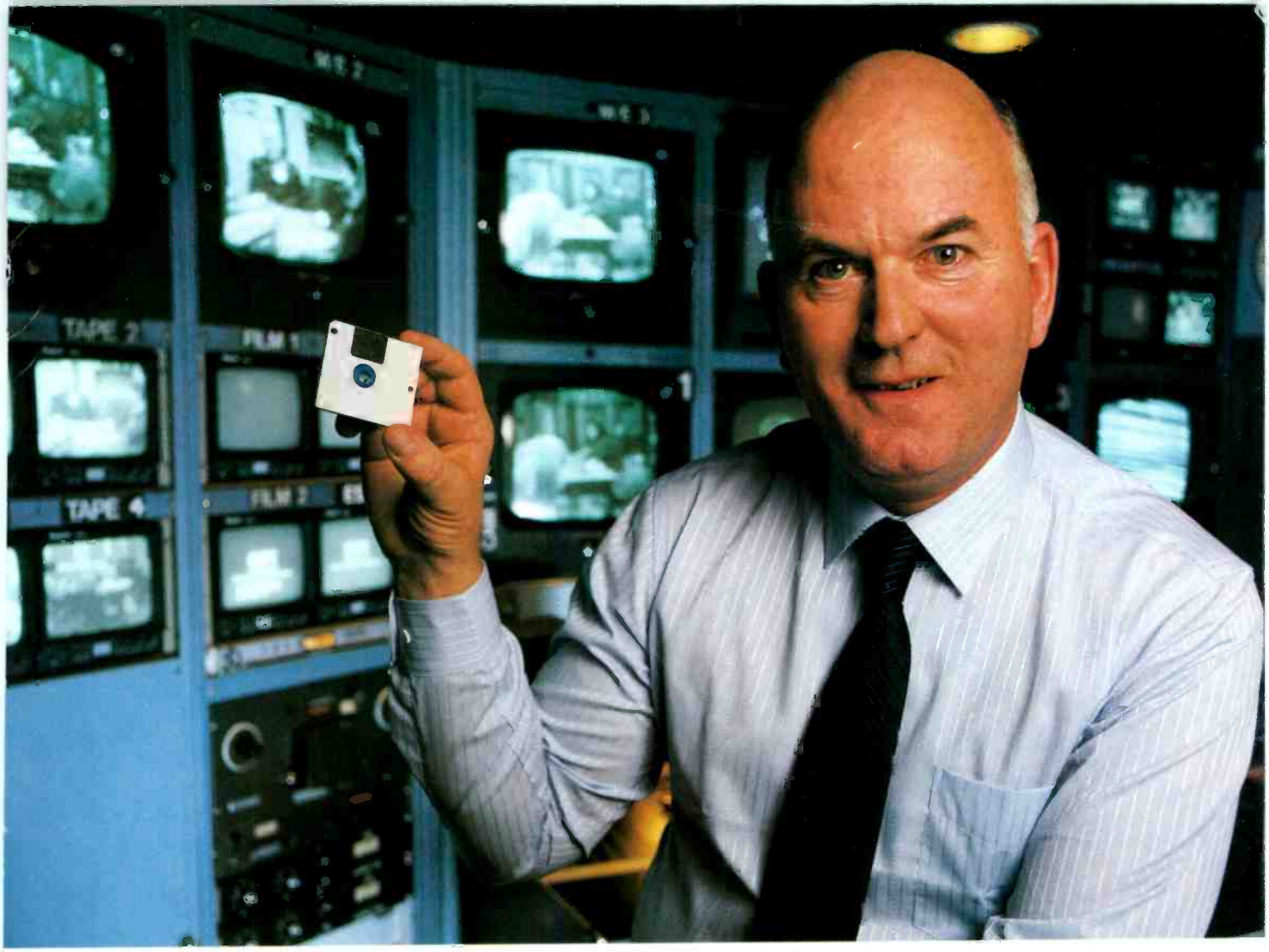
Where D-1 uses standard oxide tape, D-2 metal tape is manufactured using the same cassette housings as D-1. The D-1 shell was utilized because of its exceptional design. Although the cassettes will fit into both DVTRs, the units shown by Sony and Ampex have the intelligence to reject the wrong type of tape formulation. The cassettes come in three sizes, S, M and L. The S cassette is roughly the size of a U-matic S cassette and the L cassette comes in its own "mini briefcase." Maximum play time for the D-2 format is 208 minutes using the L cassette.

The use of azimuth recording with metal tape allows D-2 to record the 128 Mbits/s of combined video, audio and control data required. Because azimuth recording (also used in consumer format VTRs) needs no guard band for proper track separation, the packing density increases by 30 percent.

In order for azimuth recording to be most effective, Miller-Squared coding of the digital information was chosen as opposed to the NRZ coding used in D-1. The Miller-Squared energy spectrum is in a narrow band and does not have a large low-frequency component. This not only aids in azimuth recording, but it also eliminates the need for rotary erase heads and allows a greater tracking tolerance. These two benefits allow for a more simplified and therefore more cost-effective mechanical and electronic design. ■



Bartel is the chief engineer of Post Effects, a special effects/post-production facility in Chicago.



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