

APRIL 1985

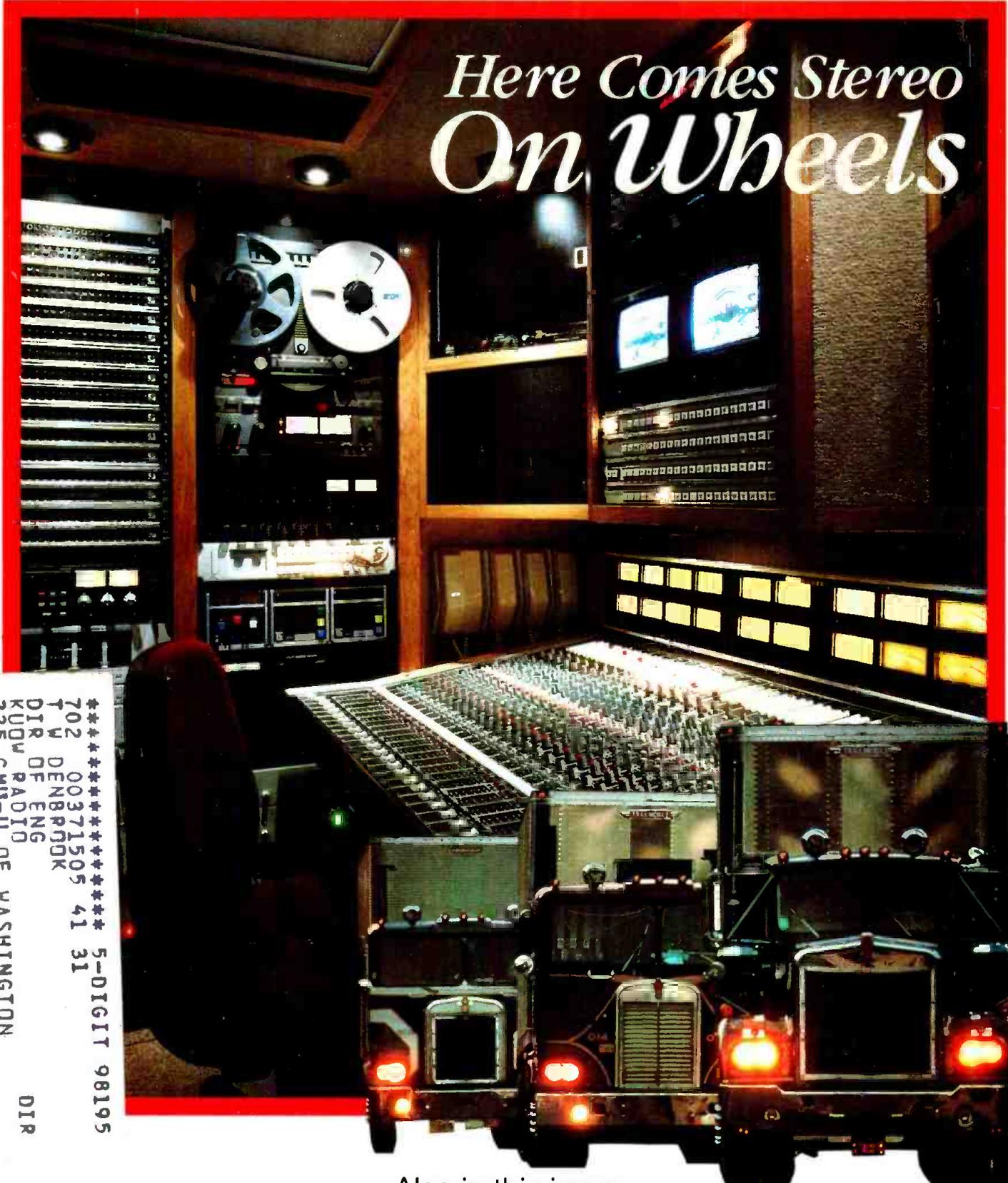
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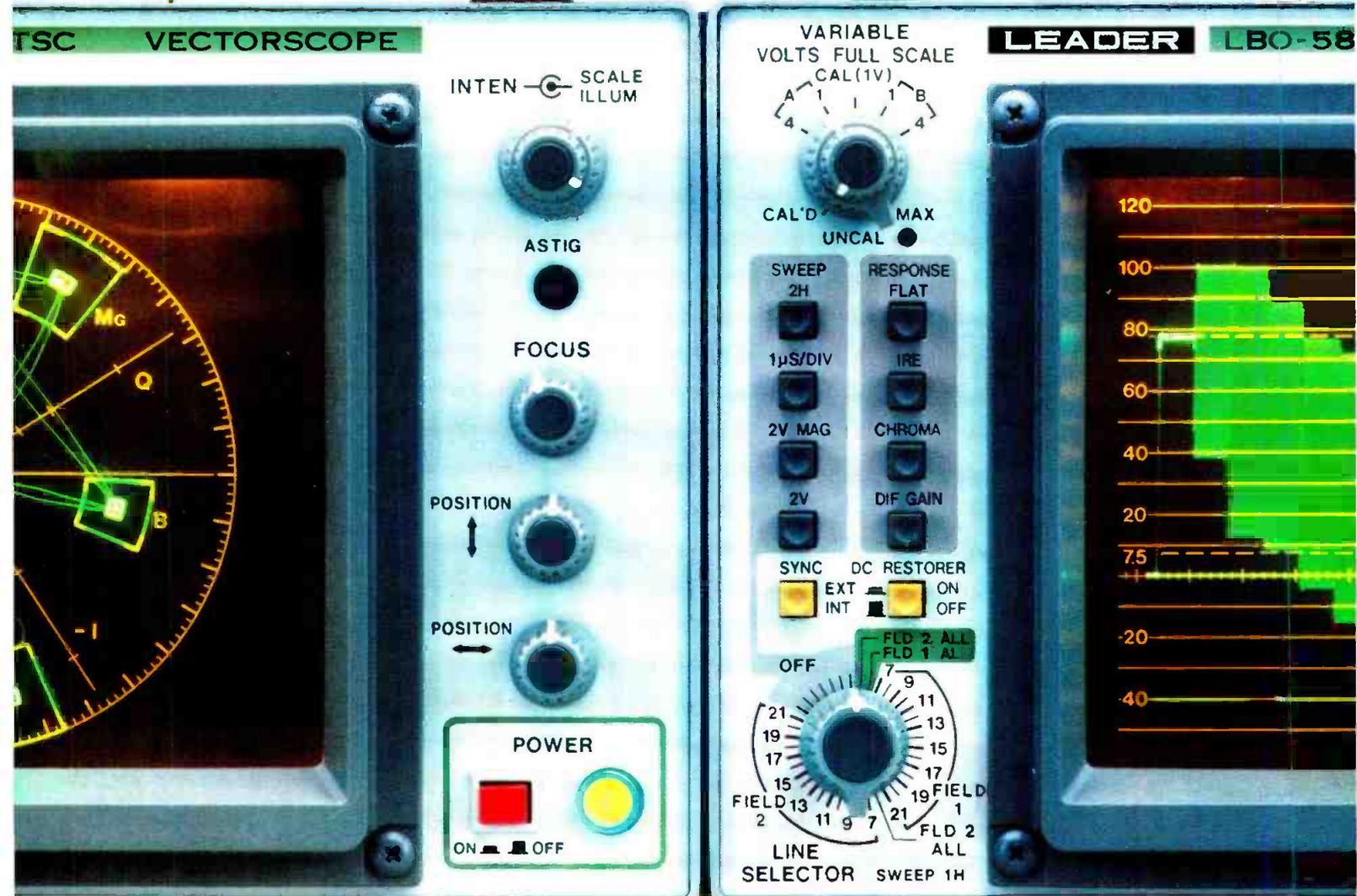
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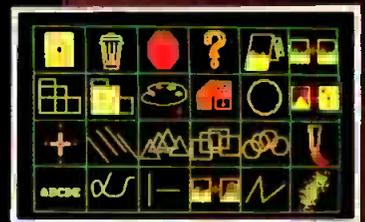
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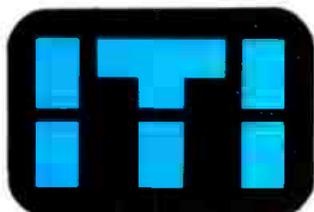


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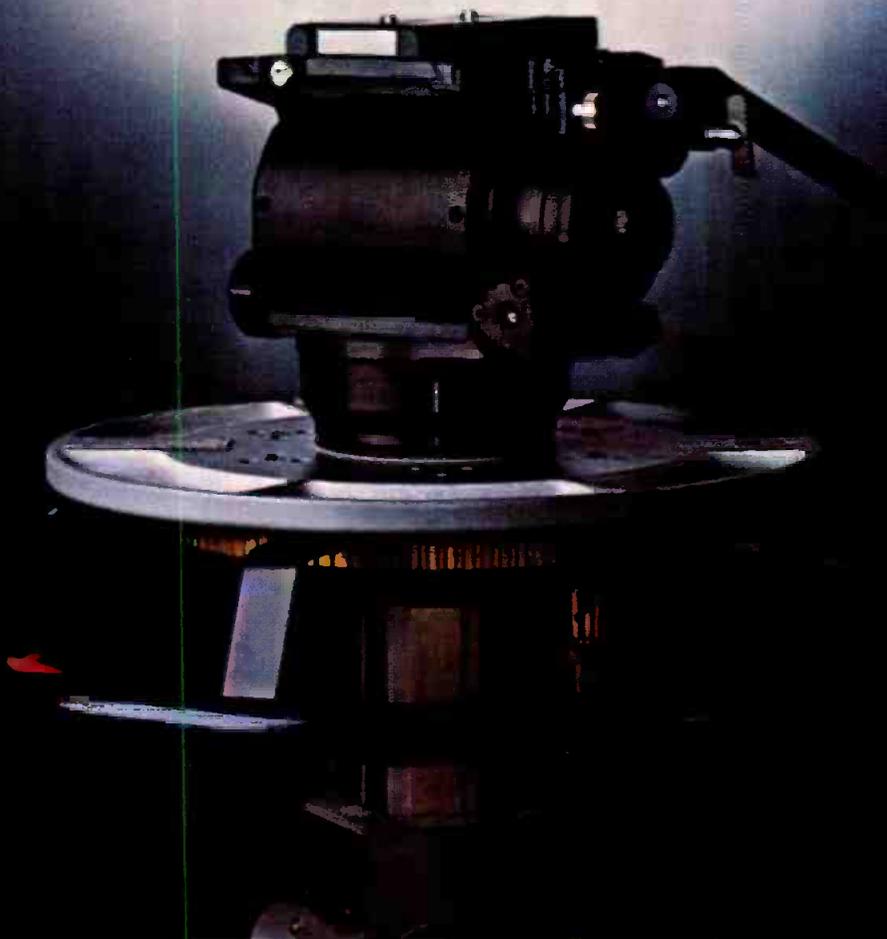
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**SONY PRESENTS THE MOST ADVANCED
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INTRODUCING THE SONY BVP-360. ON MAY 1, 1985, THE REMARKABLE BECOMES AVAILABLE.

When we previewed this camera at NAB, the response was tremendous. Which, considering Sony's considerable reputation for high performance broadcast portables, wouldn't normally seem so surprising. Except for one detail.

The BVP-360 isn't a broadcast portable. (Although at 50 pounds it's certainly the most portable camera in its class.)

What the BVP-360 represents, however, is the culmination of Sony's work in tube technology, in innovative mechanical design and in High Definition Video Systems. A highly sophisticated, automated camera that promises to usher in a new era in price/performance for cameras in the Field/Studio category.



Sony-developed 2/3-inch Mixed Field Saticon.[™] (Plumbicon[™] tubes also available.)

THE 2/3-INCH IMAGE FORMAT COMES OF AGE.

For those of you unable to get through the crowds for a close look at the BVP-360, there are two explanations for the exceptional image quality you saw on the monitors overhead.

First, the BVP-360 employs the remarkable, Sony-developed 2/3" Mixed Field* tubes. The first real challenge to big tube performance. Because they deliver twice the registration and geometric accuracy of conventional 2/3" tubes. Plus greater depth of modulation. And thanks to the special Sony-developed FET that is built into the tube and yoke, an extraordinary signal-to-noise ratio. (MF Plumbicon[™] or MF Saticon[™] tubes are available.)

Secondly, the Sony BVP-360 is equipped with a breakthrough F1.2 prism design that single-handedly results in sensitivity and depth-of-field comparable with

25mm image formats. And vastly superior to any current 2/3" Field/Studio camera at any price.

And, naturally, when you combine these factors with the extensive signal processing technology Sony has engineered into the BVP-360, you get specs which could only be described as spectacular.

A SUPERHUMAN FEAT OF HUMAN ENGINEERING.

Many of the experts who were able to get their hands on the camera at NAB were even more impressed by how it performs from a human standpoint.

Some were moved to comment by how easy the BVP-360 is to move around. Its smoothly integrated handles. Low weight. The highly maneuverable viewfinder. And the shortest lens-front-to-viewfinder distance in the industry.

Others cited the uniquely pragmatic approach to automation. An approach that concentrates the camera's considerable microprocessor-based intelligence on the most difficult setup operations: functions such as digital registration, B/W balance, flare and gamma.

And still others referred to the BVP-360's extensive camera head memory, which can store up to sixty-four scene files, eight setup files, sixteen lens files and three reference files.

Plus the advantages of being able to choose from three remote operational panels.

NOT JUST A CAMERA. A CAMERA SYSTEM.

But perhaps the most striking aspect of the BVP-360 is its "building block" design concept. An arrangement that makes it particularly easy to customize the camera for various production situations.

It starts with a



BVP-360 Remote Control Panels: (left to right) a flexible Field unit, a highly sophisticated Creative Production panel and a simple Studio unit.

camera head able to transmit component signals via Triax or Multicore. Or function as a stand-alone camera.

Then, on the technical front, alignments are handled at the Camera Control Unit. With each camera able to be tweaked individually. Or addressed as part of up to an eight-camera chain linked to one Master Setup Unit.

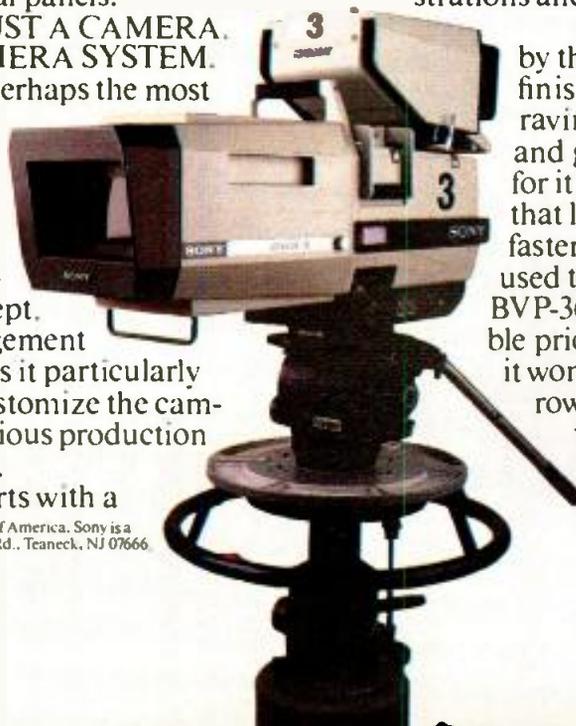
And finally, on the operational front, all control during production may be directed from one of three types of Remote Control Panels—a simple Studio model, a flexible Field unit, or a highly evolved Creative panel with extensive memory and scene-painting facilities.

ADOPT A WAIT-AND-SEE ATTITUDE.

Of course, as we said at the outset, the BVP-360 isn't ready for delivery tomorrow. But that doesn't mean you have to wait until May to see it. There are units here right now for demonstrations and evaluations.

And of course, by the time you're finished testing it, raving about it and getting a budget for it (although that last part may go faster than you're used to thanks to the BVP-360's incredible price/performance), it won't be tomorrow. It'll be closer to May 1.

SONY
Broadcast



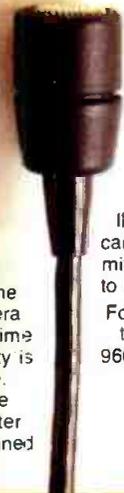
*Sony Mixed Field tubes use electrostatic deflection and magnetic focus. ©1984 Sony Corp. of America. Sony is a registered trademark of Sony Corp. Sony Broadcast Products Company, 1600 Queen Anne Rd., Teaneck, NJ 07666

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Freedom of movement is a very good reason to use wireless microphones. Even though all wireless microphones offer the same freedom from cumbersome, noisy and ever present WIRES, there are plenty of real differences. After you've made the big decision to go wireless, take the time to: compare the sound, compare the options, and compare the price. Once you do, you'll choose Telex. the dependable performer!

W.E. (Bill) Thomson, audio engineer at KPRC-TV, Houston, Texas, already had wireless mics at his station. But, when he decided to go wireless with his on-camera weather people, it seemed like a good time to compare several brands. Audio quality is extremely important to this NBC affiliate. So, along with several others, he put the new Telex system through its paces. After weeks of careful evaluation, Bill determined

ACTUAL SIZE



that the Telex system was superior. In his own words, he liked, "...the full range response and the ready option of diversity reception". Furthermore, he told us that he was "...impressed with Telex's ability to manufacture such a high quality product... at so reasonable a price."

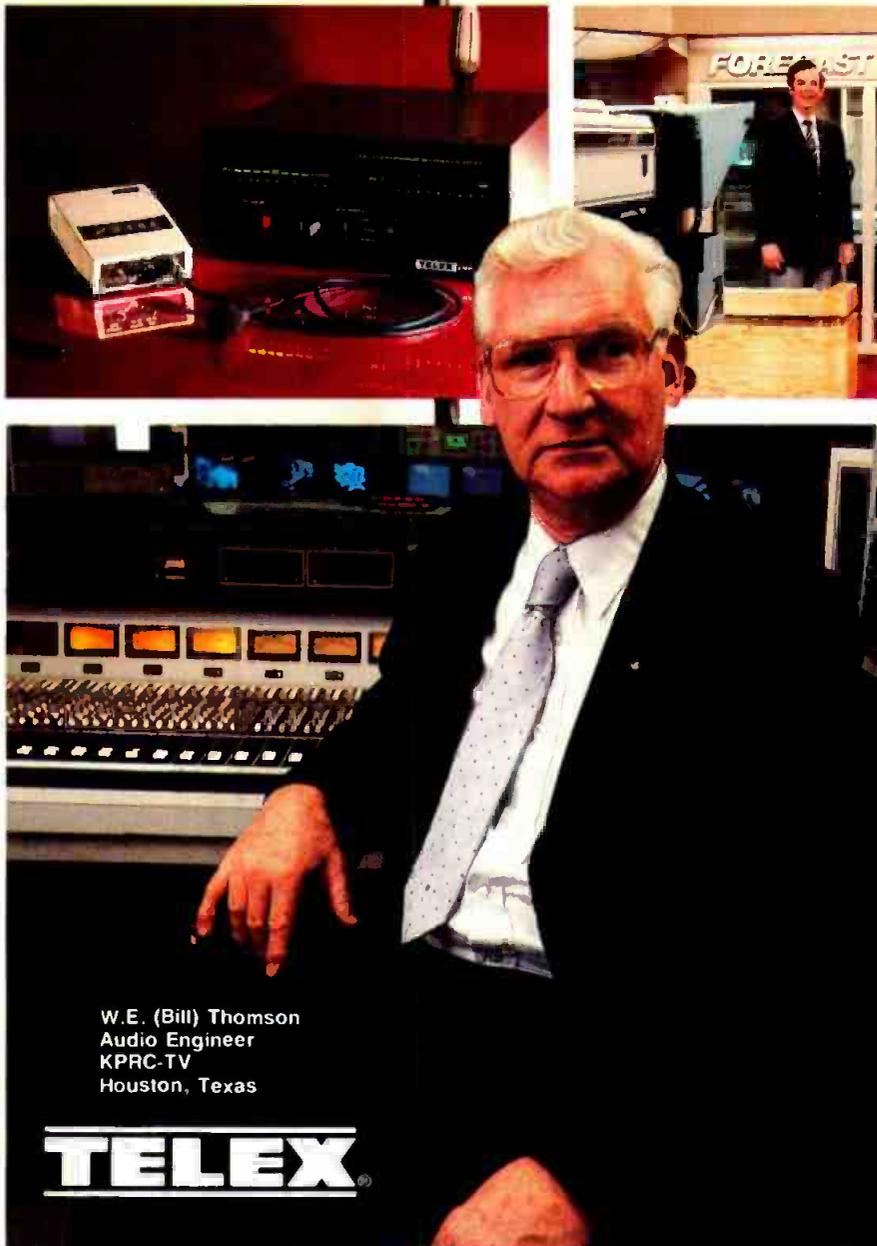
We're pleased that Bill, along with many others, has recently discovered our unique diversity receiver, our lightweight, miniature lavalier mics and our cardioid dynamic handheld microphone/transmitters. Bill tells us that he wouldn't hesitate to recommend it to anyone. Neither would we.

For more information and detailed specifications, write to Telex Communications, Inc., 9600 Aldrich Ave. So., Minneapolis, MN 55420.

For quick information, call toll free

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W.E. (Bill) Thomson
Audio Engineer
KPRC-TV
Houston, Texas

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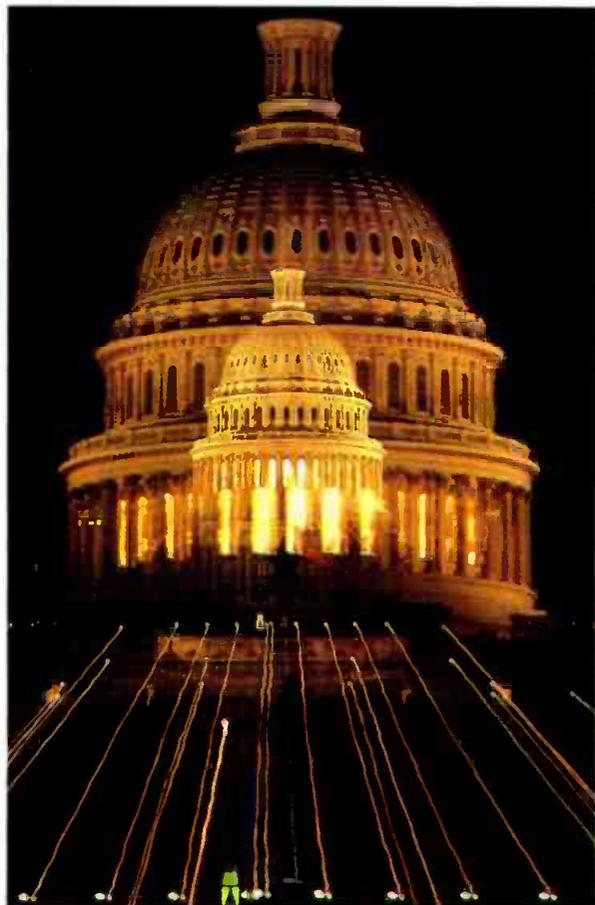
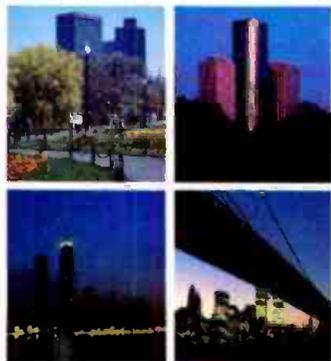
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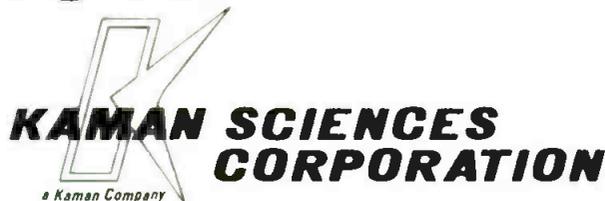


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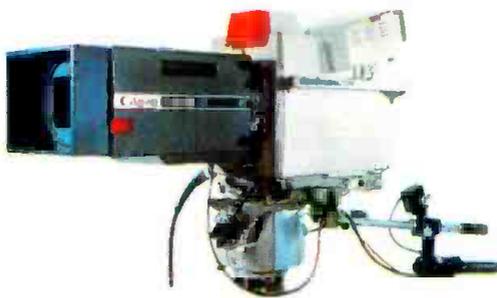


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In the M-40, we wanted the ability to produce the best possible pictures.

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The Ikegami HL-79E Series camera was selected for use aboard the Midwest M-40 because it can handle two separate functions with superlative results. Although it's renowned as the perfect hand-held camera, the HL-79E Series can easily be converted into a field camera that produces higher quality image than many other manufacturers' top-of-the-line studio models.

**Ikegami delivers
super performance in**



Ikegami 9-Series color monitors give Midwest "true to life" pictures

Ikegami 9-Series Color Monitors are standard in the Midwest M-40 mobile unit because of their superb resolution and ability to reproduce colors that are amazingly life-like. This performance is unmatched by any other monitor in the world. Since the 9-Series monitors use In-Line Gun CRTs, they provide more than excellent colorimetry and



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This exceptionally fine performance is due to Ikegami's painstaking attention to detail. Designed to meet the most rigorous performance standards, the HL-79E Series also offers optional automatic set-up, either via its own set-up computer or by interface into the HK-322 set-up computer for total system integration. With the HL-79E Series, Midwest's M-40 offers you the versatility required to produce network quality productions in any circumstances.

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News to Engineering: Get Your Act Together!

“I can’t imagine anybody in engineering knowing anything about what’s the best battery-operated portable computer,” says Jerry Rosholt of NBC in our story this month on New Technology for News.

An isolated instance of a newsman sour on his engineering department? “I find engineering to be primarily a support system for what we currently have,” says Spencer Kinard, ND at KSL, Salt Lake City. “But in terms of keeping track of the future and where we’re going as a news organization, I don’t think they have the interest, and therefore they’re not generating the information that is useful to me.”

Jim Topping, ND at KTRK-TV, Houston, agrees: “If you want to buy a transmitter or a new station, engineers are terrific. But if you’d like to know what works in the field or in a news setting, it’s very difficult.” And so agrees almost everyone else who participated in our roundtable, representing some of the most prestigious news organizations in the country. Plainly there is a serious and growing schism between news and engineering. And left unresolved, it is the kind of conflict which can quickly become an unreparable tear in the fabric of the entire broadcast industry.

There was a time when engineering could afford to ignore the obviously challenging statements by the NDs—at the time when news was simply something the station did to look good to its local audience. Now, however, news is big business, the news director is directly in charge of a large capital budget, and he has a right to demand the kind of engineering which is tailored to his needs. Otherwise, Sheldon Hoffman of NBC will be correct for the entire industry when he says that “the larger the organization the more unlikely it is that the chief engineer will make the ultimate decision.”

The chief *must* retain control, and to do that he *must* change his attitude towards the news. But are the demands being made by the NDs such a bitter pill to swallow? Is not being up to date, current with the latest technologies, in touch with industry developments one of the main duties of the broadcast engineer? As the industry grows, today’s engineers must accept the challenge to grow along with it or be forever left behind.

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Only Harrison could produce this operationally-superior console. At Harrison Systems, we concentrate on doing one thing—building better consoles. And the AIR-7 is just that—a better broadcast console. We think you'll find AIR-7 is what you're looking for. Call or write us for more information.



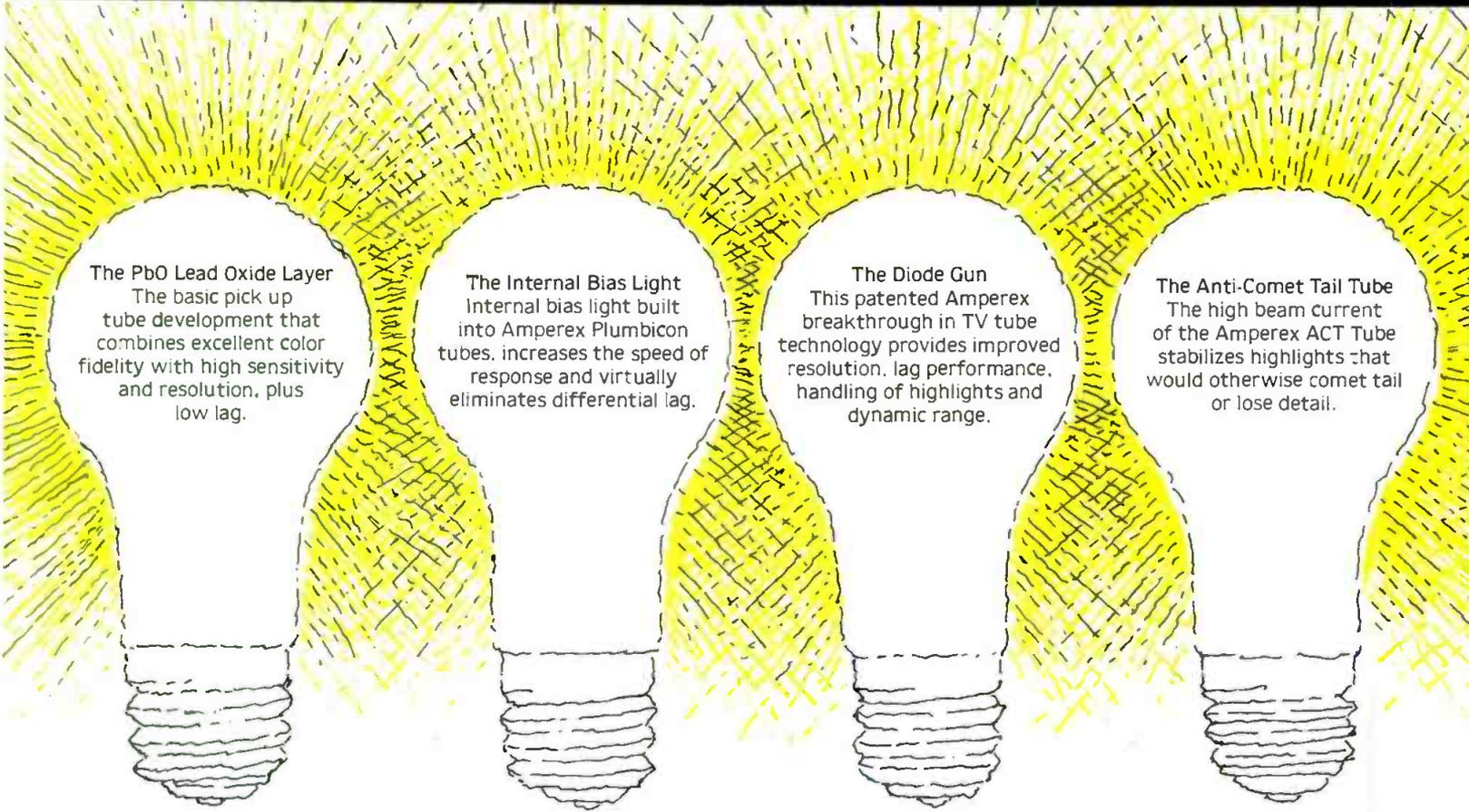
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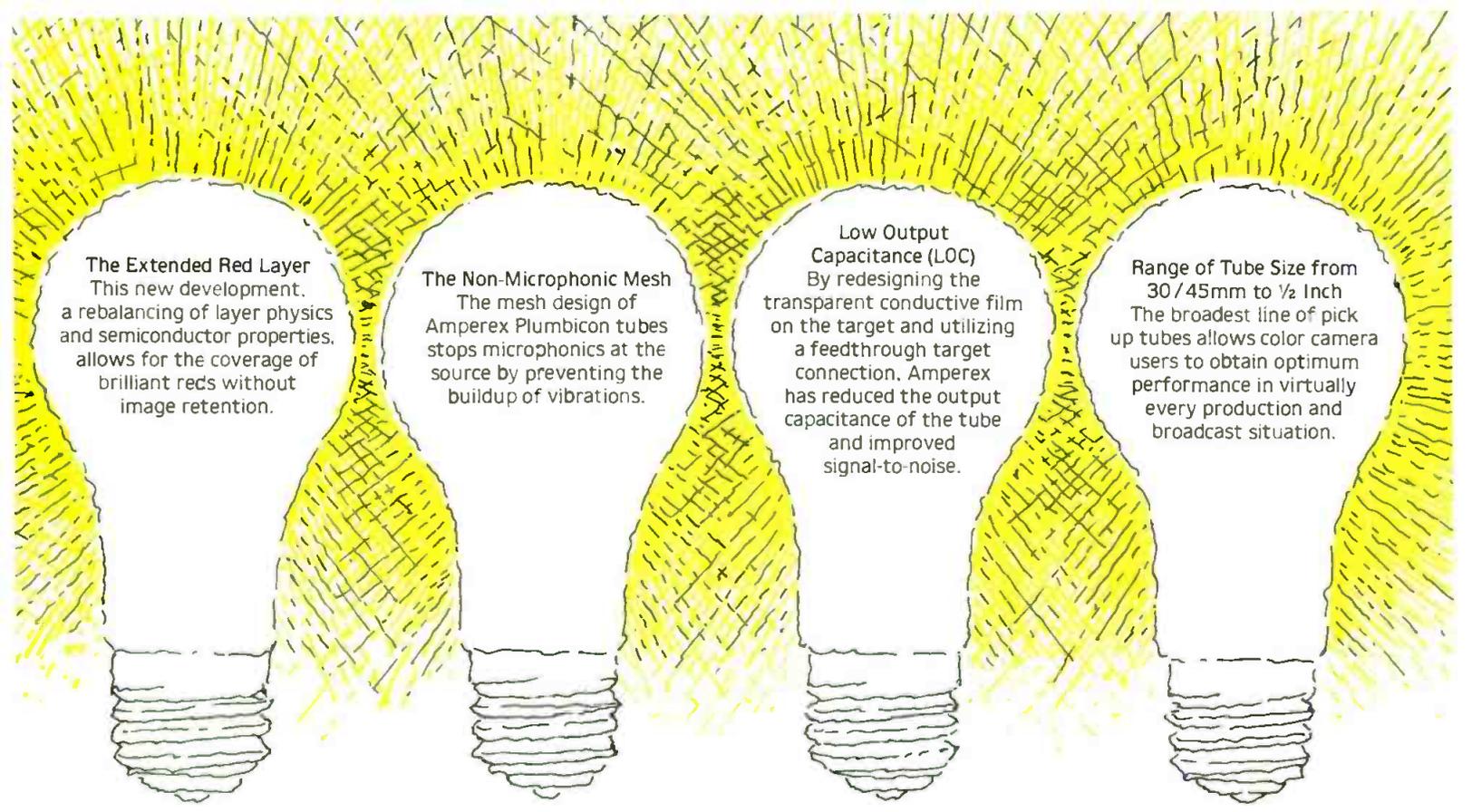
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ATSC & SMPTE Formulate HDTV Production Standard

Working frantically to define a U.S. recommendation to put forward at the worldwide CCIR meeting later this year in Geneva, the HDTV Technology Group of the U.S. Advanced Television Systems Committee (ATSC) has recommended an 1125-line, 60 Hz, 2:1 interlace standard with an aspect ratio of 5.33:3 for studio production of HDTV programming.

This is essentially the same standard which was originally developed by NHK in Japan and which is currently being marketed here by Sony and Ikegami. A major difference, however, is the 5.33:3 rather than 5:3 aspect ratio, chosen so as not to generate spurious signals on the international distress frequency.

SMPTE, also working for the past year on developing HDTV standards,

was quick to give its full endorsement to the ATSC recommendation, citing its desire for a "strong and unified USA position" at the CCIR meeting.

Just three weeks prior to the ATSC announcement, a SMPTE working group on HDTV production had expressed its preference for a 1:1 progressive scan standard rather than the proposed 2:1 interlace. According to Renville McMann, chairman of ATSC's HDTV group, however, 1:1 progressive scan has not been demonstrated adequately for other CCIR countries yet, and would therefore meet with great resistance if proposed as a worldwide standard at this time. Sony Broadcast president William Connolly observes, too, that the U.S. will have a hard enough time getting the 60 Hz standard through without incurring ex-

tra difficulty with the 1:1 proposal. Both ATSC and SMPTE have resolved to continue work on the progressive scan standard.

Separately, Roy H. Pollack, executive vice president of RCA, recently suggested in a speech that "Perhaps there should be worldwide high-definition television standards; but perhaps as we quantify potential economic waste," which he defined as a product or service without adequate value, "there should not." He went on to say that improvements to the existing NTSC system could "suggest to the human visual system the equivalent of high-definition video."

Even with the more familiar interlace system, other CCIR members may object to the proposed 60 field-per-second specification. Early demonstrations of 60 to 50 Hz converters did not provide great results, and European proposals have preferred 80 Hz. McMann hopes for an enthusiastic reaction, however, after the San Francisco meeting, where NHK showed a frame conversion system that was generally considered satisfactory even for production. McMann also thinks that PAL and SECAM users may find the 60 Hz attractive since it avoids the 50 Hz's flicker, which is important for projecting HDTV.

Ikegami Celebrates Twentieth Anniversary

It was 20 years ago last December that an obscure Japanese electronics manufacturer, Ikegami Tsushinki Co., decided that its future lay in export and set up a small sales office in New York City. Previously, in 1962, the company had sold several HL ("handy looky"—no one is certain how the name was derived) cameras to CBS-TV, which used them to cover the first manned space flight, Aurora 7. The black-and-white camera, codeveloped with NHK in Japan, was believed to be the first transistorized, portable camera on the market, and it caught the attention of American broadcasters.

Ikegami's first color camera, the HL-33, was delivered to CBS some 10 years later, and was the camera that sparked CBS's move into ENG (although the backpack electronics alone weighed over 20 pounds).

Ikegami president Nick Nishi tells the story of the fierce competition among the networks during the early days. "About three months after we had delivered the first camera to CBS," he recalls, "I got a call from Mike Fisher at ABC to find out when ABC could get one of our cameras. I



Ikegami president Nick Nishi with one of the early HL-33 color cameras (backpack and camera head, right), and the HL-95 Unicam recorder/camera, Ikegami's latest model, at left.

was completely surprised, because the CBS deal had been top secret. I told Mike he couldn't have a camera, because CBS had ordered it first. So he tried to reassure me by saying that since CBS had already taken delivery of the first camera, there was no need for exclusivity anymore."

Not too much later, as pickup tube sizes began to come down, Ikegami introduced the HL-35, and subsequently the HL-77 and 79. The rest is history. Today, Nishi heads a company with net sales in the U.S. (1984) of \$71 million.

APR Bach Concert Aims Live from East Germany

What was believed to be the first live transatlantic radio broadcast from East Germany to the U.S. was scheduled on American Public Radio on March 21 to top off a day of special programming in honor of the three-hundredth anniversary of the birth of Johann Sebastian Bach.

The satellite concert, featuring Bach's music, was arranged by Boston's WGBH radio in a joint venture with the Rundfunk der DDR, East Germany's radio network.

The concert was carried by 290 APR affiliates and CBC radio stations at 2:00 p.m. EST, originating from Leipzig, where Bach spent much of his life. It featured the music of the Gewandhaus Orchestra of Leipzig under the direction of Kurt Masur and the Chamber

Choir of the Franz Liszt Musik-hochschule of Weimar.

Technical details of the live transmission were coordinated by WGBH radio. Anita McFadden, the project's technical director, said the transmission alone cost about \$30,000.

According to McFadden, she took an audio feed at the Gewandhaus from the East German radio network from an audio setup intended to bring the broadcast to East German radio stations. McFadden fed the signal through a Sony PCM F-1 digital encoder, and the resulting digital audio signal was then transmitted via video land lines to a central TV switching control in Leipzig.

From there it continued on land lines to East Berlin, then on to West Berlin, Hamburg, Frankfurt, and Munich, and finally to a satellite uplink in Raisting. McFadden said that arranging for the numerous landlines was the hardest part of the event, but was necessary be-

cause Raisting is the only point in Germany with an uplink to a satellite which distributes to the U.S.

The still-digital signal was sent up to Intelsat's Pathway 2, Channel 1 and to the Comsat downlink at Etam, WV. AT&T and local land lines brought it to New York's public station WNET-TV, which sent it to WGBH via Eastern Educational Network land lines. WGBH decoded the digital signal and uplinked it to Westar IV for reception by APR and CBC stations. McFadden estimated a delay of less than one-half second to complete the intercontinental transmission.

Although this apparently was the first time a live broadcast was done from a country behind the Iron Curtain, McFadden said there were no political problems and the East German government was cooperative. She said it's possible that WGBH will undertake more live transatlantic broadcasts in the future.

FCC Issues Proposal On UHF-VHF Swaps

The FCC has formally proposed allowing noncommercial VHF stations to trade their channels for cash to commercial UHF operators without third party hearings. The idea has generated considerable interest and controversy since FCC commissioner James Quello proposed it early this year as a way to raise funds for public television. Selling VHF channels for less desirable UHF assignments could net public stations millions of dollars, but important obstacles remain, especially concerning the FCC's authority to eliminate comparative hearings.

Whether the FCC has the power to effectively allow public stations to trade V for U is unresolved. For the rule change to be effective and not endanger the licenses of stations that want to trade channels, third-party challenges on grounds other than public interest would have to be eliminated. (Public interest challenges would be allowed under the proposed arrangement). The U.S. Supreme Court's Ashbacker decision of 1945, however, has been interpreted as barring the FCC from awarding channels without comparative hearings. Although the Commission's policy division said the FCC can exclude third parties from the swap process, it is expected that the courts may make the final decision in a test case.

Diminished reception from switching to UHF is another issue which the FCC has to resolve. Chairman Fowler said at the proposal meeting that he considered "comparable" coverage, as opposed to "congruent," to be enough and suggested 80 percent as an acceptable figure. Other commissioners generally said they would give weight to the public broadcaster's opinion.

Additional provisions offered for comment in the proposal are whether stations licensed to different communities but serving the same market could swap; whether permit holders and public VHF channels not in use would be included; and how public stations could use profits from the sales.

The commercial value of the approximately 120 public VHF channels is considerable. Commissioner Quello has estimated public stations could
(Continued on page 16)

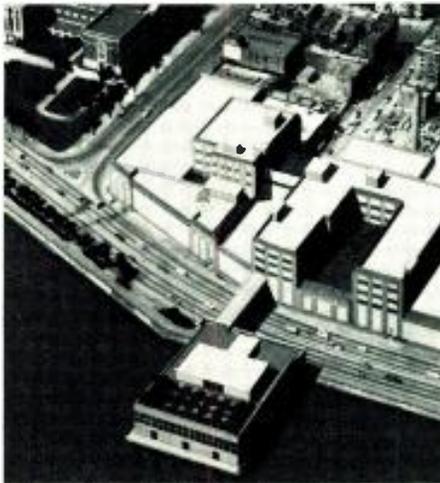
New Studio to Keep Soaps in New York City

Engineering consultants for the Manhattan Television Center will probably feel like kids in a candy store during the upcoming NAB show.

The newly announced TV production facility, a \$100 million project occupying 500,000 square feet of abandoned factory space along the East River in Harlem, will house a total of seven TV production studios when completed.

At present only an empty shell, the center was conceived by real estate developer Arol Buntzman in an attempt to keep TV production in New York or lure more of it from the west coast. Ambitious plans for the center have already landed soap opera sponsor Proctor and Gamble, which will keep three of its programs in New York. *The Guiding Light*, *As the World Turns*, and *Another World* are slated to move into the studios in June 1986.

In the meantime, the task for outfitting the new studios has fallen to technical consultants Imero Fiorentino Associates. John Leay, IFA technical facilities consultant, said he will be taking his shopping list to the NAB for equipment for three studios of 14,500 square feet apiece. Leay said plans call for the purchase of 14 cameras, 17

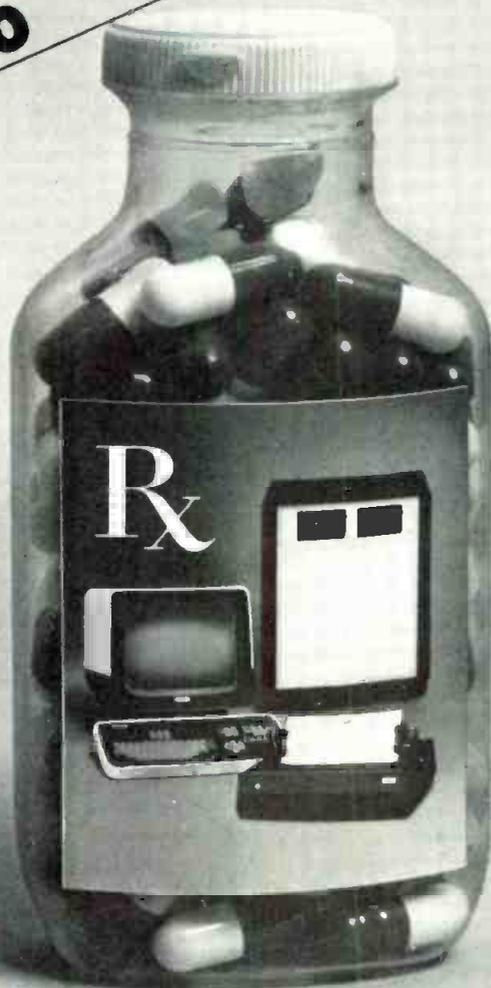


The Manhattan TV Center is a state of the art production facility in Harlem that will become home to three soap operas next year.

VTRs, three control setups, and three editing suites, all set up for multi-channel sound and foreign language dubbing. There are also tentative plans for a satellite uplink, although Leay said no definite decision has been made on that yet.

The center was officially announced at a Valentine's Day news conference attended by New York's very showbiz-minded mayor Edward Koch. Koch pointed out what he considers an added benefit of producing a TV show in the city, namely "a mayor who is available for cameo appearances."

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SMPTE TV Conference Defines Components of the Future

If you walked in on the middle of the opening film at the recent SMPTE TV Conference in San Francisco, you would have seen *An American Symphony*, a remarkably well-produced, well-photographed, technically sound, and artful 35 mm film showing scenes from around the country. The remarkable thing about the production, however, was not its content, but that it was shot and edited by Rock Solid Productions entirely on half-inch component Betacam. The footage was then transferred to film by Image Transform.



Part of SMPTE-organized demonstration of analog and digital components with both serial and parallel interfacing.

It was literally impossible to tell, even on a large screen, that the footage was originated on video, or that it had gone down several generations in the video edit before being transferred. Indeed, if a date is to be recorded in history about when half-inch component video made its first noticeable mark on the broadcast industry, this would have to be it.

The film, of course, was only one part of a spectacular conference, which highlighted developments in component video, as well as stereo audio for TV and several other new technologies. The conference also included a SMPTE-organized demonstration of analog and digital components, proving exactly how well all the new proposed standards fit together and bringing the reality of the all-component studio that much closer.

Among the systems demonstrated were the just-published SMPTE specs for a three-channel parallel interface—either RGB or Y, P_B, P_R (Y, B-Y, R-Y); the multiplexed analog compo-



Audio equipment exhibitors were represented at the TV conference for the first time.

nent serial interface (S-MAC) standard introduced several months ago; translation back and forth between parallel and serial processing; analog component signal sources; digital component signals conforming to CCIR recommendation 601; and the Scientific-Atlanta B-MAC system for DBS, proving how easily analog component signals can be handled within conventional satellite systems.

Yet even as these various demonstrations were taking place, rumors were circulating that, by the time of the NAB, American broadcasters would have yet another choice in half-inch component formats to further crowd the waters already alive with M-format, Betacam, the 1/4-inch developments, et al. The new contender is M-2, a second-generation M-format system from Matsushita Japan, which sold 100 units to NHK around the time of the SMPTE show.

M-2 is *not* compatible with the original M-format system. And it is *not* designed for field use as part of a recorder/camera system. What it does offer is the long-awaited long playing time using standard half-inch cassettes—a full 60 minutes from a T-120. Image quality has apparently not been sacrificed, since the player offers a full 5 MHz bandwidth. And those who have witnessed the stereo audio of M-2 define it in one word: awesome.

There were other rumors about half-inch component video, too, centering around the questions as to who will be the first to extend the 20-minute playing time limit on M-format and Betacam recorders to a full 30 minutes, considered essential for automated on-air operations. Everyone's been working on it furiously. But an unconfirmed

source said that 3M had already delivered at least one shipment for testing, that the shipment had been rejected, but that a second shipment had been received and was out in the field being tested.

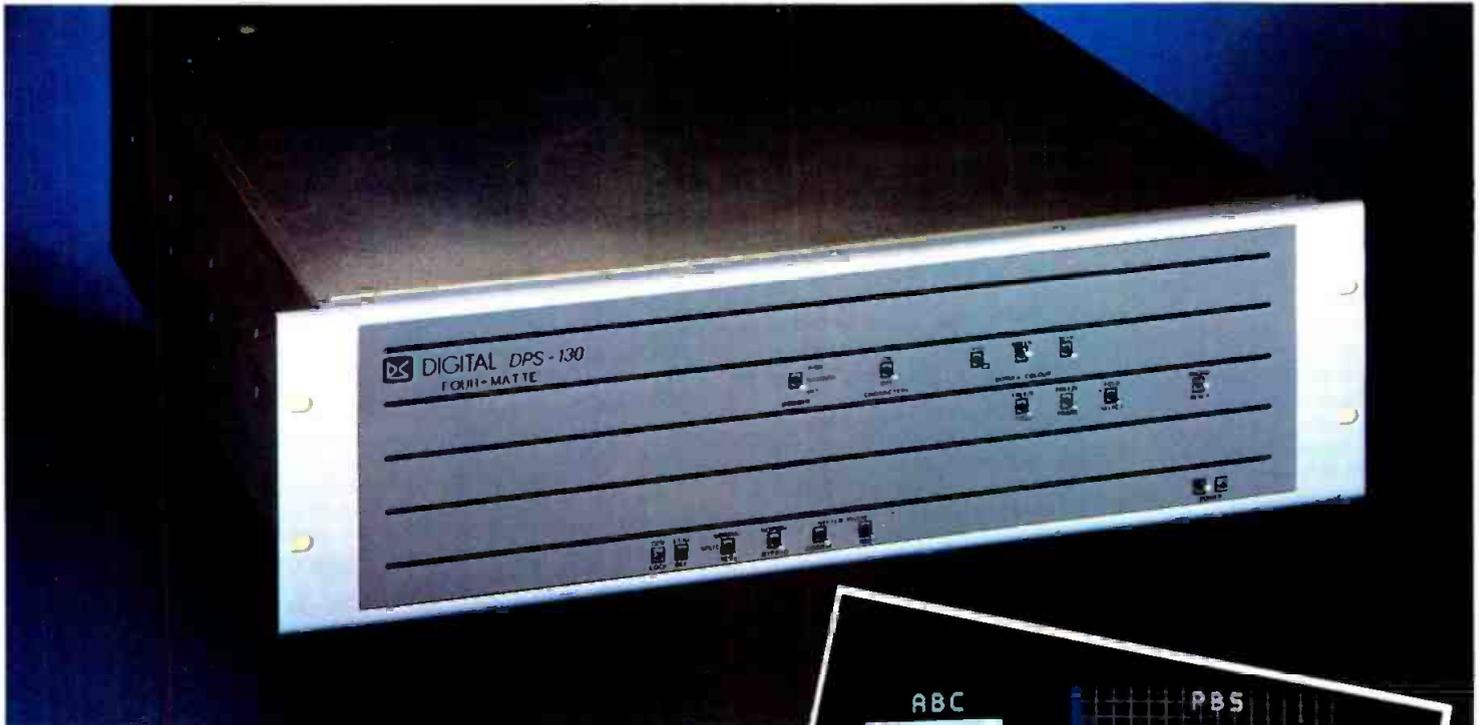
The demonstration of analog and digital component compatibility was particularly appropriate in the light of rapid progress being made by Fred Remley's Working Group on Digital Recording Standards. Remley's report on the group's progress disclosed, for the first time, the dimensions and shape of the new plastic cassette that will house the 19 mm DVTR standard tape (close to but completely different from 3/4-inch U-matic). The extremely thin tape (16 micrometers) will run at 11 ips, and will be initially available in lengths of 11, 30, and 72 minutes—though longer playing times are expected in the future.

Although the specific track format is still to be determined, the group is working with several specific criteria in mind. The helically recorded video tracks will be separated by four digital audio tracks. Helical recording of the audio will prevent edge damage to longitudinal tracks. The tape will also contain several other tracks, however: for time code, control track, and analog audio information, allowing easier editing of the audio signal.

On the exhibit floor, several companies had major pieces of analog component hardware. Perhaps most interesting was For-A's new CVM-500 component post-production switcher, which will be available later this summer in the \$20,000 range. True to its analog component processing form, the switcher produces extremely clean chromakeys and downstream keys.

The conference and exhibit dealt, for the first time this year, with audio for television—indeed, SMPTE has just put out for balloting a recommended standard dealing with stereo audio for one-inch Type-C recording. Complete strangers to the TV conference—manufacturers such as Sound Technology (automated audio test equipment), Modulation Sciences (which introduced the first stereo reference decoder designed for TV stereo), B&B Systems (monitors for TV sound verification), Orban (the Optimod-TV audio processing system); and several others suddenly found they had a new home in the world of TV audio.

DPS-130 FOUR-MATTE



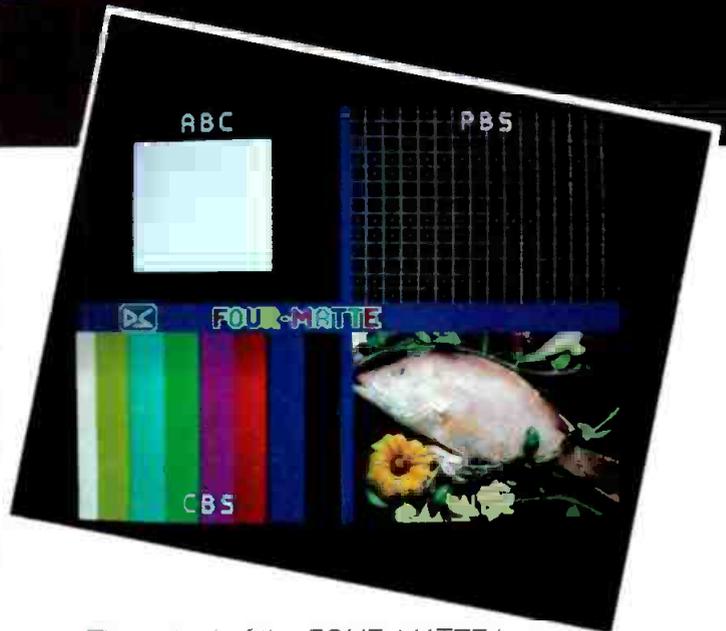
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The output of the FOUR-MATTE is RS170A, enabling use as a switcher for alternate level of effects.

The freeze frame ability permits stop motion of all frames simultaneously. A border is generated with selectable colouring. There are such features as HØ and BØ controls, internal processing amplifier, and component video processing, as well as an interfacing available for an optional programmable audio switcher and more.

The burst and horizontal timing is front panel adjustable using a series of up/down counters. FOUR-MATTE can also be configured for monochrome only.



DIGITAL

a subsidiary of Scientific-Atlanta

(Continued from page 16)

make "from \$25 million to \$400 million per station, depending on the market." Susan Harrison, vice president at the broadcast consulting firm of Frazier, Gross & Kadlec, Inc., of Washington, DC, calculates that since 1980 the average sale price of VHF network affiliates in ADIs 25 to 50 was \$55 million, compared to UHF affiliates' \$17.5 million. In the top 25 ADIs,

she reports, independent VHF's fetched an average of \$130 million, while UHF's brought \$35 million.

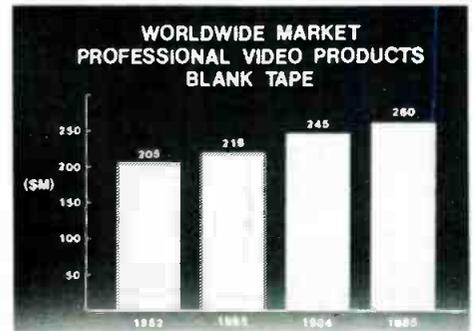
Commercial stations, Harrison predicts, would experience "a dramatic restructuring" of competition. "Comparing 1984 sign-on/sign-off ADI ratings and shares of the top UHF and VHF independents in 12 markets, we find the VHF indies outperforming their UHF counterparts by two to one.

Obviously, this ratio cannot be expected to apply in every market," she adds.

Cable has partly offset the difference in UHF and VHF reception in the home, and FCC Mass Media Bureau chief James McKinney has said his office will determine cable penetration in markets where stations want to swap.

Healthy Increase Seen In Broadcast Tape Sales

With video penetrating further into the post-production field and home VCRs booming, Ampex Corp.'s director of marketing, Ed Pessara, has forecast that the broadcast videotape market will continue its steady growth for the next 10 years. Professional audio tape is also expected to post gains.



Pessara noted, "Because most post-production facilities now rely on videotape for their editing and distribution functions, industry unit sales of broadcast videotape continue to climb." Videotape is expected to replace film as a primary medium in additional areas.

The Ampex executive also believes that the home VCR market, which grew from nine to 16.4 million units in the U.S. last year, is creating "an ever-increasing demand for program material—material that has been edited, distributed, and in a growing number of situations, shot on videotape." The meteoric climb in



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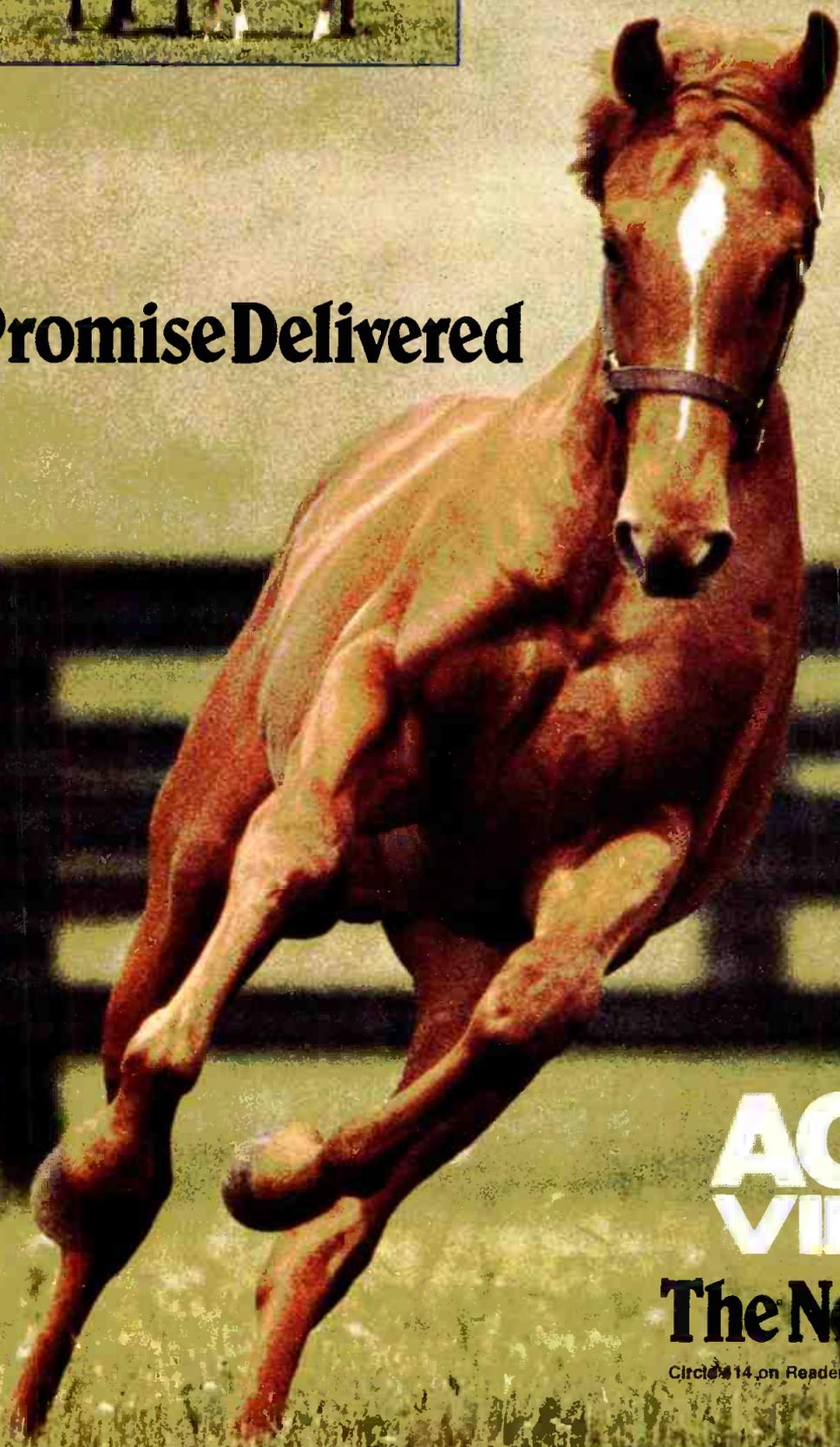
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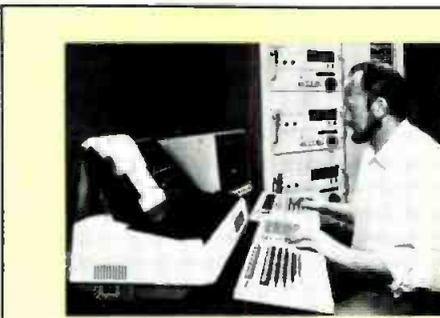
worldwide half-inch tape sales slowed to an estimated 44 percent last year, and 1985 is expected to produce a 29 percent increase.

As for professional video formats, 3/4-inch and one-inch pro videotape sales reportedly rose nine to 12 percent last year and are expected to grow 13 to 15 percent in 1985. Two-inch tape is said to be losing ground each year.

The pro audio tape market is said to have been "refueled" by music video and digital recording, aiding its modest growth in both 1984 and 1985. Digital recordings, however, will make up a larger piece of the pie each year.

NPR's CPB Funds May Go to Public Stations

Under a new funding arrangement proposed by National Public Radio for fiscal 1987, public radio stations may start receiving the money which CPB now gives to NPR. In turn, they would pay fees to the NPR for its programming, essentially becoming NPR subscribers. NPR feels the plan would allow it to



The first Betacart multi-cassette system has gone on-air at WNET-TV, the PBS station in New York City. Two program promos, a Natural History museum spot, sta-

tion ID logo, and corporate underwriter acknowledgement composed the station break debut, all on Betacam HG-20 tapes. Kathleen Walsh, executive producer/manager of WNET's on-air continuity, commented that the new system allows her to "create a station break that has variety and excitement for the viewer without tying up every playback and editing facility in the house." Here, engineer Freddie Dudash enters the spot and promo playlist.

predict its revenues more accurately.

NPR, which produces *All Things Considered* and *Morning Edition*, was shaken up financially a year ago after going heavily over budget, but reportedly has come back to record an on-target year for fiscal 1984.

As the plan is currently envisioned, radio funds that CPB usually hands to NPR would instead be added to CPB's

Community Service Grants to stations. Each station would then pay an annual fee for NPR programming based on a fixed percentage of its anticipated actual and in-kind revenues, or nonfederal and federal income.

NPR would then be able to look at CPB's budget, calculate how much would go to public radio stations, and know approximately what its member-

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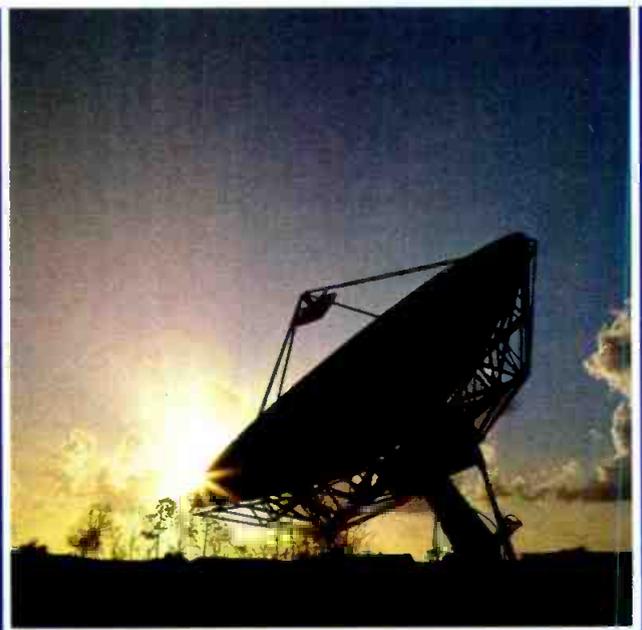
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ship income would be. Under the current arrangement, NPR cannot predict the CPB allocation, which in FY 1985 amounted to \$10.3 million of its \$22 million operating budget.

Also, CPB support has declined in real terms, according to NPR board chairman Donald P. Mullally. He also stated that CPB has indicated it may start funding national producers other than NPR, which in the past has been

considered identical with national public radio broadcasting. A spokesperson for NPR suggested that CPB may be trying to balance the many requests it gets for federal programming dollars.

Mullally commented that under this plan, "NPR and the stations would have a strong mutual interest in increasing audience, and federal and local support."

The new funding arrangement is be-

ing examined by NPR stations, who will discuss it at the Public Radio Conference next month in Denver. Although feedback was just beginning to come in at press time, the NPR spokesperson said that stations seemed to be responding favorably. NPR and the stations are expected to discuss details of how the fee would be determined, such as whether the percentage should be adjusted so as not to bite into larger stations' budgets.

In related matters, the Reagan administration recently cut \$14 million from CPB's \$200 million budget for FY 1987. The White House has repeatedly cut the CPB budget despite heavy Congressional support, notably from Sen. Barry Goldwater (R-AZ). Sonia Landau, the Reagan-appointed chairperson of CPB's board, said that "considering current fiscal restraints," the reduced budget is "an excellent base from which we in public broadcasting can work with the Congress."

KGO-TV, KATU, WOKR Win Double Irises

KGO-TV, KATU, and WOKR each won two Iris Awards in NATPE's annual competition for locally produced television programming. Twenty-three other stations also picked up trophies from among the nine categories, which are divided into markets one through 20, 21 through 50, and 51 and up.

In the entertainment category, WBBM-TV, Chicago, won for "The Jacksons Are Coming! The Jacksons Are Coming!," KOIN-TV, Portland, for "Pillars of Portland," and WOKR, Rochester, for *Merrill Lynch/RPA Television Series Concert*. For short subjects, the winners were WNEW-TV, New York, for *Big Apple Minutes*, KATU, Portland, for "The New Oregon Drunk Driving Law," and WHA-TV, Madison, for "Vietnam Afterimage: A Madison Portrait."

Public affairs winners were KGO-TV, San Francisco, for "The Fog Never Comes To Chinatown," KSL-TV, Salt Lake City, for "Utah's Favorite Things," and WOKR for "The Riots: 20 Years Later." Program segments awards went to WTVJ, Miami, for "Pickup," KGTU, San Diego, for "Trivial Pursuit," and WMTV, Madison, for "PM Magazine: Herman The Worm."

For sports, WBZ-TV, Boston, re-

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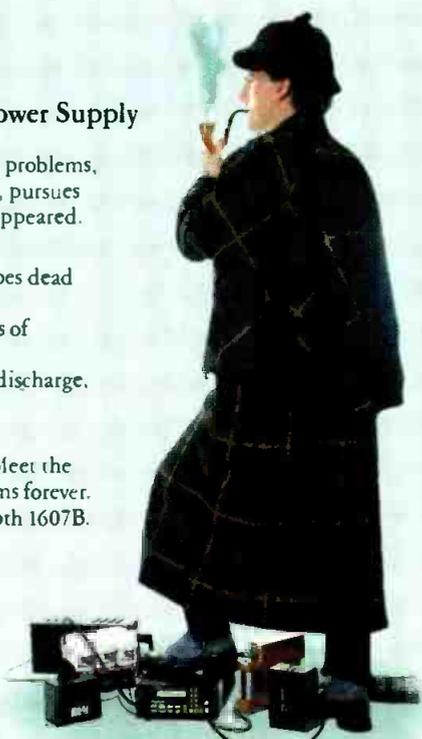
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NEWS

ceived an award for "The Profit Play," KATU for "The Wacky World of Sports," and WTVQ, Lexington, for "The Roses of May." WCVB-TV, Boston, won in the children's category for "Christmas In the Colonies," WRAL-TV, Raleigh, for "Frog Hollow," and KGMB, Honolulu, for "Best of Hawaii's Superkids."

Talk/service/information awards went to KYW-TV, Philadelphia, for

"People Are Talking/White Collar Cocaine Addicts," WAVE-TV, Louisville, for "The House With A Heart," and Louisiana Public Broadcasting, Baton Rouge, for "Louisiana: The State We're In." The magazine category was won by KGO for "Front Row Video," KCST-TV, San Diego, for "Weekend Magazine," and KITV, Honolulu, for "Island Life With Emme Tomimbang." Last but not least, the

"all other" category awards went to KQED, San Francisco, for "The People Versus Dan White," WWL-TV, New Orleans, for "The Sun King," and KYTV, Springfield, for "Annie Special."

Trademark Law Protects Calls, DOC Board Rules

Call letters can be registered, like a station logo, according to a recent decision handed down by the appeals board of the Department of Commerce's Trademark Office. Broadcasters became vulnerable to sound-alike calls last year when the FCC decided it would no longer handle the issue.

WSM-AM of Nashville obtained this decision from the Trademark Office, which has previously refused to allow stations to register their calls as trademarks, saying that the FCC owned the calls. The office now says, however, that it can offer this protection.

Broadcasters wishing to register their calls should call the Trademark Office at (202) 557-3268 for a brochure and forms. Processing costs \$175 and takes about 16 to 20 months. Even for a station that does not register its calls, however, this decision is expected to help in defending in court against a competitor's mimicry.

AM Stereo Battle Continues Unabated

Several recent developments, two technological and one of a legal nature, are keeping the long-standing fight between the two remaining AM stereo systems heated up.

This situation remains despite victory claims by Motorola, whose C-Quam system boasts 181 stations of its own; 160 Harris stations now broadcasting C-Quam; and 22 radio receiver manufacturers producing C-Quam-only radios.

On the tech front, Sony, through a licensing agreement with Hazeltine Corp., has started selling multisystem ICs which, when installed in a receiver, sense and decode whichever system is being used. Aimed at car and home radio manufacturers the ICs cost from \$2-\$5.

In addition, Leonard Kahn, who stubbornly refuses to give up the ghost in the AM stereo war, has a device he

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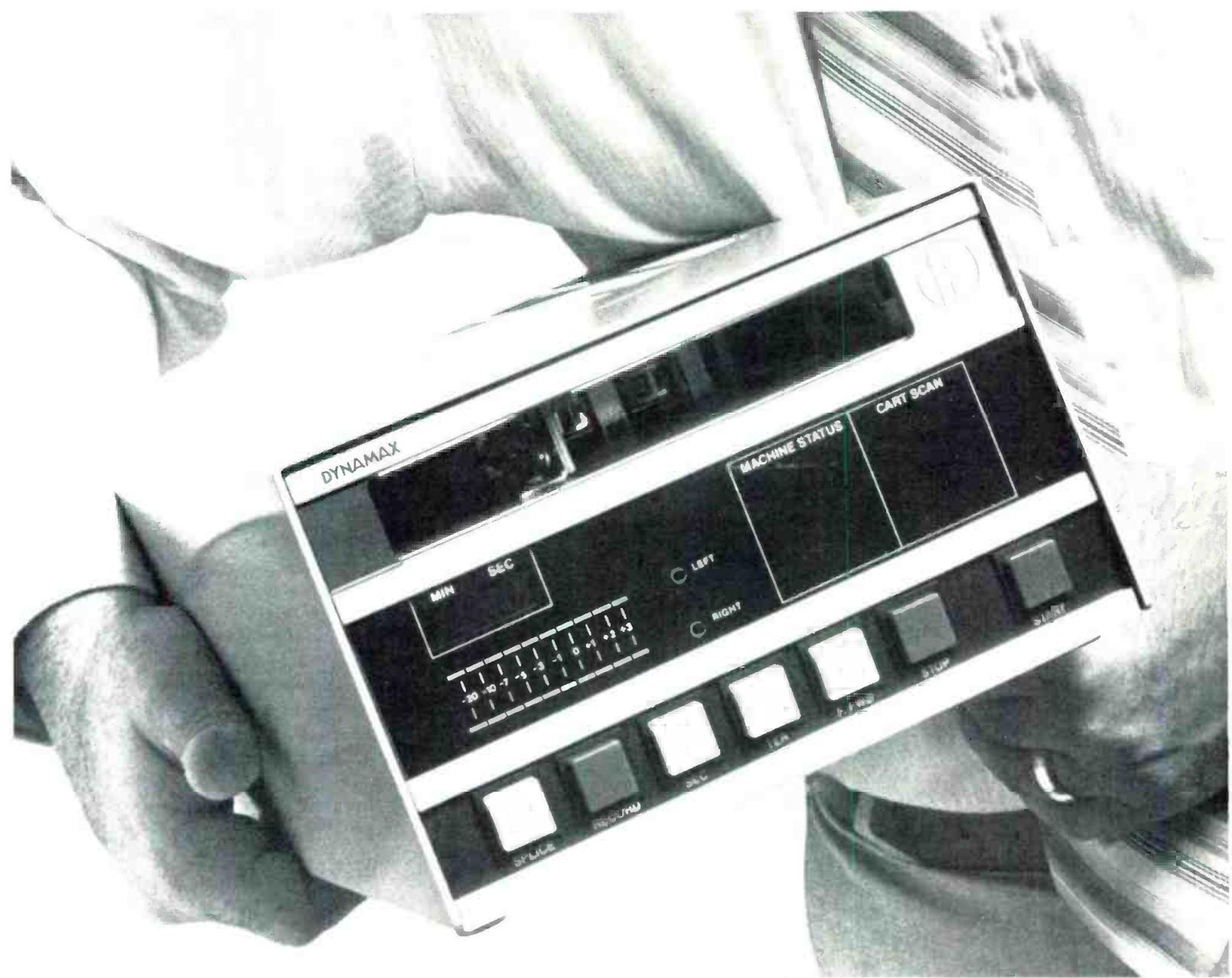


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says can be attached to an existing C-Quam receiver to allow it to also receive Kahn stations.

Kahn has about 75 stations broadcasting on his system, and is quick to point out they are in major population centers such as New York City, where the only AM stereo stations (WQXR and WNBC) both use Kahn exciters. But he also includes in his count all-talk stations like WABC and KABC that are

using Kahn exciters for sideband modulation.

Kahn says his converter, which he is calling "The Secret," can be installed in 15 minutes and costs about \$36. He won't reveal The Secret's secret, but he says that basically it leaves C-Quam reception untouched in the radio while pulling in Kahn system stations. In fact, according to Kahn, The Secret will optimize Kahn stations' reception

so that they sound better than C-Quam stations, which is how he would like listeners to hear it anyway. In all fairness, Kahn's stated concern is that AM stereo be hi-fi so it will gain widespread acceptance by listeners who have switched their dials to FM.

"AM radio is too sick to take a dose of bad medicine," says Kahn. He says he has shown The Secret to receiver manufacturers and broadcasters and has gotten a positive response from both.

On the legal front, Kahn has asked the Justice Department and the Federal Trade Commission to investigate Motorola and Harris in light of the recent Harris decision to switch its stations to C-Quam and manufacture and market the Motorola exciters. Kahn says this may be cause for an antitrust concern. He also wants action taken against C-Quam receiver manufacturers who promise stereo sound. He says it's false advertising if they don't warn that Kahn stations cannot be received in stereo.

Reportedly, the FTC is gathering information on Kahn's allegations. Kahn has retained the New York law firm of Phillips, Nizer, Benjamin, Krim and Ballou to fight the legal fray.

Dick Harasek, Motorola AM stereo manager, says there's been nothing official from the FTC yet, and that the company will wait and see what develops before making any statements.

Referring to Kahn's Secret, Harasek says he has a sample of the device, which he says is "a series of compromises" of stereo reception, which "to a degree degrades the performance of the Motorola system." He says if Motorola feared a lot of Secrets were going to be used, the company would take action based on the performance degradation consideration. But he says the trouble and expense of installing it, especially in a car radio which would need to be pulled from the dashboard, will make it unfeasible. And, he adds, "To my knowledge there are no takers for either The Secret or the Sony multisystem IC."

Lew Eads, merchandising manager for Delco, which makes the best-known C-Quam-only car radio, says he hasn't seen Kahn's Secret yet, but would probably not want any part of any device that attaches to an existing radio. He says the company is evaluating the Sony multisystem chip.

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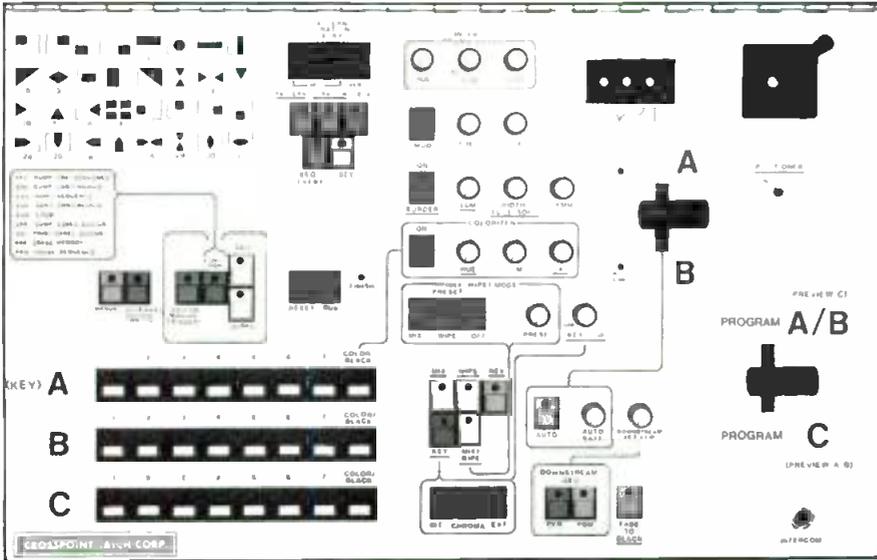
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Crosspoint Latch Controllers, such as the 7209, are by far the easiest ones, in the industry, to program. The procedure is simple—set up the switcher panel to the required configuration and depress the STORE button. The switcher is automatically readied for the next event.

EXAMPLE OF A SEQUENCE

A SEQUENCE is a group of EVENT REGISTERS. Consider the following sequence. A bordered circle opens up to surround a model's face, stays constant for a few seconds, then closes in with the border changing color while it wipes the face off; this is followed by a diamond pattern which moves diagonally to a different point of the screen, opening up and changing the color of the border as it does so, until the pattern ends up surrounding a picture of the product being advertised.

This sort of sequence can be stored in the switcher, recalled by the Editor and then triggered by it at the correct instant.

The DURATION time for each of the above transitional movements can be programmed up to 999 frames, and can be reviewed and altered at any time. In addition to this a delay of up to 999 frames can be introduced between each of the transitions. (This permits a transition followed by a pause to be programmed in each EVENT).

The basic 7209 stores one SEQUENCE consisting of four EVENTS. The 99 SEQUENCE option stores an additional 396 EVENTS. Any one of the 400 Events can be recalled individually as a stationary panel configuration, or any SEQUENCE can be recalled and "run".

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Crosspoint Latch uses the same editor (or computer) protocol for all its switchers. The protocol is the simplest and the fastest one to implement, and is the ideal one for computer control of a switcher. Crosspoint Latch has interfaces with almost all current Editors.

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but points out that there are also time and cost considerations. He explains that even a chip that costs under \$5 would probably double the cost of the finished radio receiver. And with on-the-road testing, he says it would be two or three model years before cars could roll off the assembly lines with a multisystem radio.

Right now, Eads says, sales of the Delco radio are "booming." He rejects

Kahn's allegations of false advertising.

"We've always been very careful to let consumers know that our radio will work for C-Quam stations only," Eads said. He added that he was anxious to see the war between the two systems come to an end so that radio manufacturers could start to concentrate more on improving AM stereo reception by working on widening the bandwidth and noise blanking circuitry.

"AM broadcasters have had three years of controversy that could have been put to better use promoting AM stereo," he says.

Fairness Doctrine Repeal Unlikely

At recent open panels held by the FCC to discuss the fairness doctrine, broadcast and news groups made a strong representation in favor of repeal of the doctrine, but the Commission seemed unlikely to attempt any major changes since its authority over that issue is not at all clear.

Among supporters of repeal were the networks and most station groups, plus the NAB, NRBA, and RTNDA.

Besides numerous public groups, which came forward to argue against repeal, and Group W, which found the doctrine to be "a basic obligation" for the media, Rep. John Dingell (D-MI), chairman of the House Commerce Committee, warned the FCC, "It would be terribly unwise for the Commission to proceed further along its present course." Dingell said he would sponsor legislation to replace the doctrine if it was repealed by the FCC.

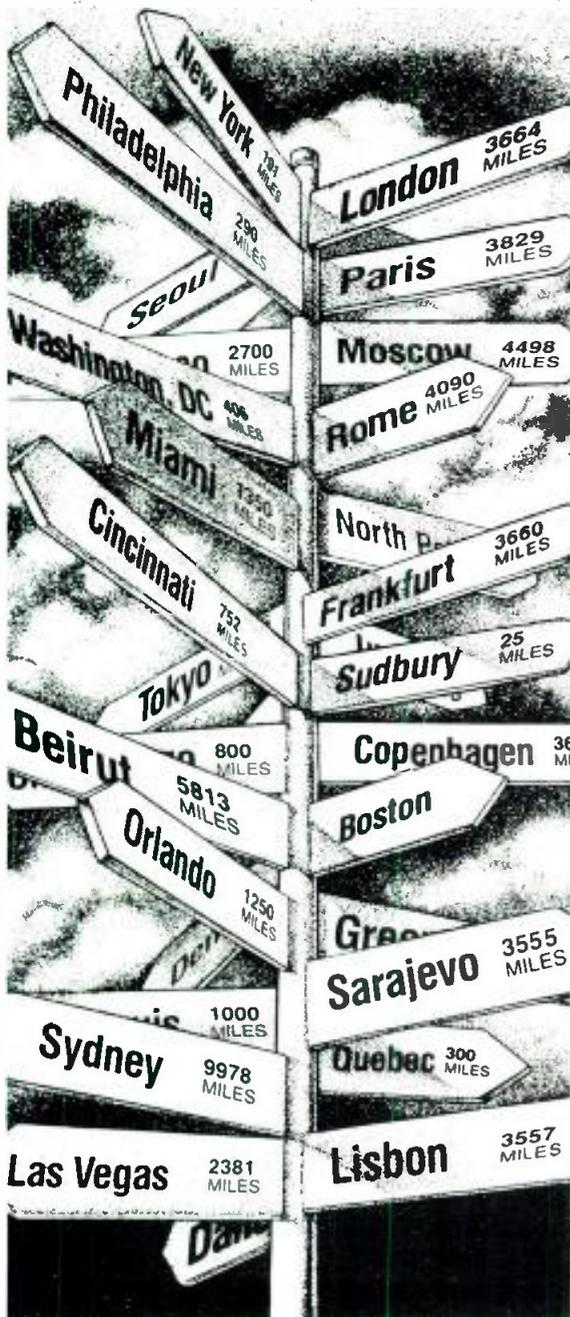
Power Measurements Made More Flexible

Broadcasters will find it easier to measure operating power under new rules designed by the FCC to allow more flexibility. Among the changes:

- AM stations can now use direct reading frequency (RF) power meters.
- If AM antenna resistance changes, the station can resume power determination by the direct method, using antenna current and resistance, once the new antenna resistance has been measured. The station still has to submit the new value using FCC form 302.
- For FM and aural TV transmitters, the power meter can be calibrated using either an external wattmeter or an indirect method. Note: the aural TV meter must still indicate power relative to 22 percent of the peak visual ERP.

The Commission emphasizes, "The burden of measurement accuracy and proper calibration of measuring instruments rests with the broadcaster in all cases."

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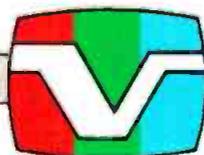
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NEWS BRIEFS

RKO General has announced that it plans to sell its Radio Networks to United Stations Radio Networks 1 and 2 Inc., a private company owned by four partners, one of whom is Dick Clark. RKO's radio stations are not included in the deal.

News department salaries rose zero to five percent at television stations during 1984 and declined for many job positions in radio, according to an

RTNDA survey. An exception was the highest paid television anchor, who reportedly received a nine percent raise on average. . . . The NAB's Employment Clearinghouse has been expanded to include a "personnel pool" for qualified **minorities and women**. The pool lists over 25 categories. Call (202) 429-5497.

Cable and pay television, newspaper publishing, and business informa-

tion services lead the communications industry in terms of five year growth from 1979 to 1983 in revenues, income, cash flow, and profit margins, according to Veronis, Suhler & Associates, a New York investment banking firm. CATV also reportedly scored a 31.0 percent growth rate in 1983 compared to radio and television's 12.8 percent growth. Broadcasting, however, produced a 23.1 percent return on assets in pretax operating income for 1983 compared to CATV's 9.8 percent.

A proposal that television commercials targeted at **children** be coded so that parents could delete them with a special device was rejected by the FCC.

The Radio Advertising Bureau reports that **1984 national radio advertising revenues** rose 13.8 percent to \$1.45 billion. Spot soared 15.8 percent to \$1.18 billion, while network grew 5.5 percent to \$267 million. . . . Torbet Radio's annual report shows 25-54 as the **most requested age cell**, accounting for over 36 percent of Torbet's requests, except in the south where adults 18-49 are number one. The national spot profile also finds that nearly 30 percent of all business is placed on a one week flight, 17 percent on two weeks, and 15 percent on four weeks.

According to the National Religious Broadcasters' 1985 directory, the **religion format**, part- or full-time, increased last year by 101 radio, 11 television, and seven LPTV stations, resulting in totals of 1043 radio and 92 television outlets.

A new **call letter kit** is on the market which provides a "very current" list of all available calls, excluding those in use or applied for. Lists of calls incorporating two-letter combinations can also be created. For information and prices, contact the Radio Information Center at (212) 371-4828.

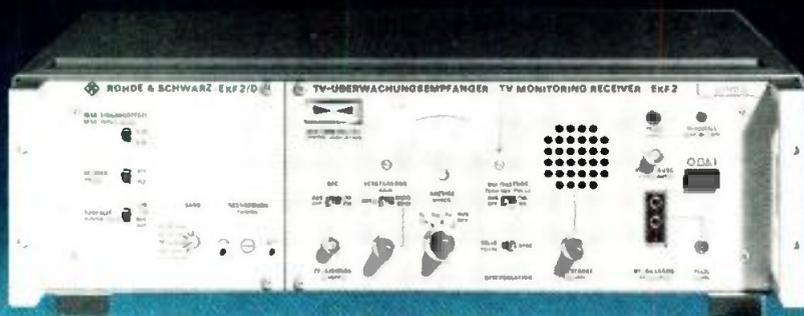
FCC licensed technicians and engineers can apply for **NARTE certification** until the end of this year without taking an exam. Call (503) 581-3336.

SMPTE and the University of Southern California are sponsoring a one-day seminar, "**Stereo for Television**," focusing on stereo parameters for film and tape production, at USC's campus on May 11. Fee is \$45, early registration is recommended. Call (213) 743-7469.

SMPTE's Montreal/Quebec Special Meeting will be held in Ottawa April 26 to 28.

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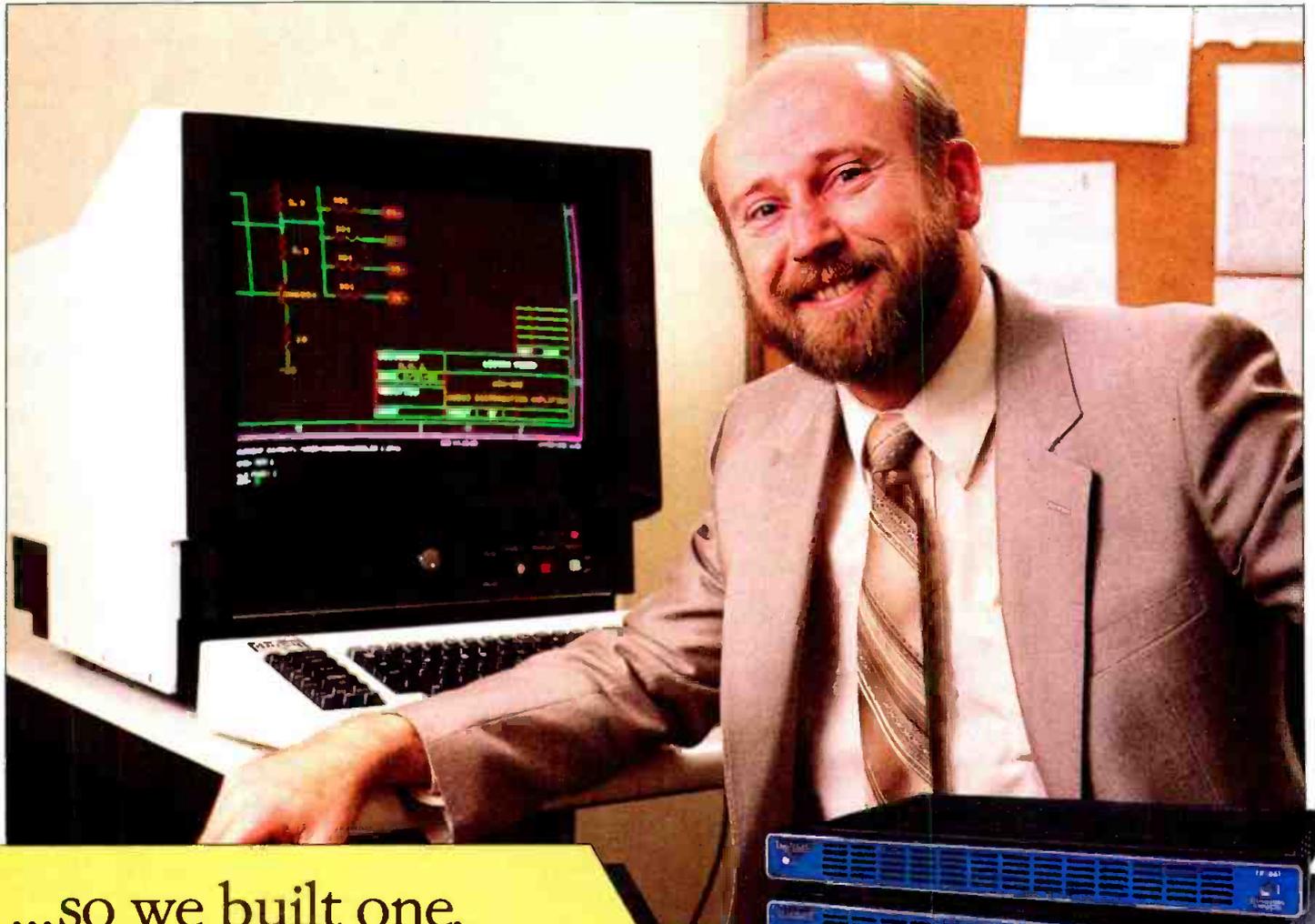
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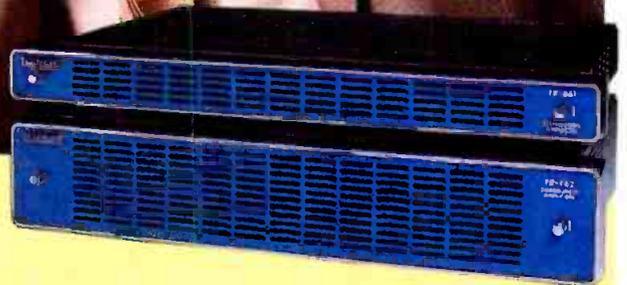
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RADIO programming & production

900 Telephone Network Brings Indy 500 to 700

By Judith Gross

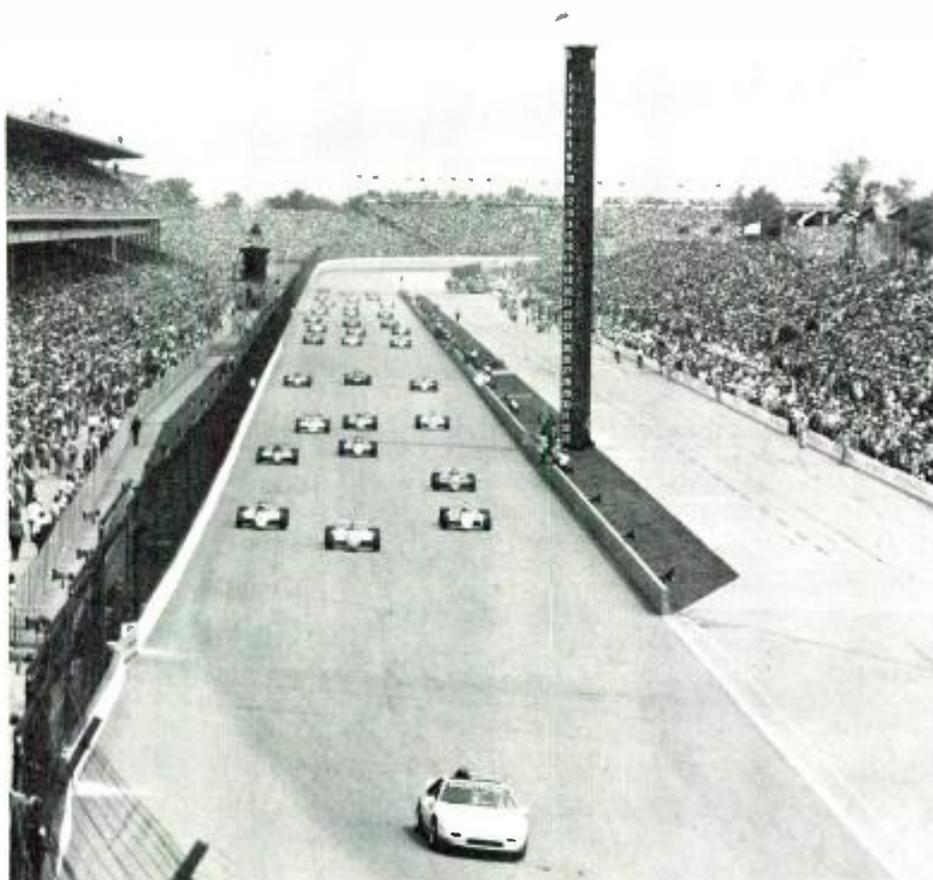
Last year, when Indianapolis Motor Speedway Radio began to make arrangements for broadcasts of the Indy 500 race to nearly 700 affiliate stations, director Russ Arnold discovered he had a problem. In past years, the network traditionally made arrangements with Ma Bell to run dedicated phone lines from the network, through phone company offices, to the stations which carry the preshow and trackside reports. But 1984 marked the breakup of the phone company, and the prospect of having to hardwire 700 stations in nearly every corner of the country meant connections through hundreds of local offices, plus dealing with new regulations governing the newly defined phone company regions.

"The divestiture of AT&T made it impossible to do it the way we had," Arnold explains. "There were possible delays of weeks."

900 "Dial-It" service

Enter AT&T's "Dial-It 900" service. The service, which carries a modest charge for calls, was originally conceived as a mass-calling service, for special applications such as allowing listeners to express their opinions on particular issues by calling one 900 number to vote "yes," another to vote "no." In this way, potentially dangerous overloading of local telephone circuits by too many call-ins is avoided.

The broadcast industry, especially TV, has been quick to put the 900 service to use. ABC's *Nightline* frequently uses 900 numbers to get public opinion on issues of national importance. NBC's *Saturday Night Live* pulled a number one Nielsen rating when it allowed viewers to call 900 numbers to decide the fate of "Larry the Lobster" (he was cooked). Other radio and TV applications have included a "name the baby" contest on the soap opera *The*



Affiliates of Indianapolis Motor Speedway Radio will receive live broadcasts of the Indy 500 through AT&T's "900" telephone service.

Guiding Light and a vote to pick a new "official laugher" on New York station WPLJ-FM. And the service has been used in a variety of telepromotions which involved the print media.

But the 900 service has a second use with which AT&T execs were hoping to interest radio programmers. In addition to polling votes, a live prerecorded message could be placed on-line, giving anyone who called the 900 number access to the message. This 900 application is called the Announce Distributed Network (ADN) and to AT&T, its use seemed tailor-made for radio stations. To Arnold, this seemed like a perfect solution to the Indianapolis Motor Speedway network's problems with the phone companies.

Last year, then, for the first time, instead of dedicated phone lines, the nationally available 900 service brought Indy 500 race reports to 700 radio affiliates. And this year, when the track officials say "Gentlemen, start your engines," the procedure will be the same.

The Indy's use of the 900 ADN system was the first large scale application of that particular telephone service for radio programming. It opened a new door for programmers, giving them a quick and simple way to set up a network. Now, in instances where microwave, satellite, or traditional hardwired phone lines were impractical, the mass calling system would be the answer. AT&T began to look at the ADN part of

RADIO PROGRAMMING

the system in a new light.

"In modifying the service to a different use we found it to be cost-effective," explains Karl Savatiel, AT&T media division manager. "We're slowly migrating ad hoc networks from a dedicated to a switched network."

Other sports applications

The Dial-It 900 service has also been used in the past year to bring radio reports from other sports networks. The Cleveland Browns Football network sent reports to about 30 affiliates, and the Motor Racing network (separate from the Indy Speedway network) sent race reports to some 70 radio affiliates once a week.

Another sports network, Host Communications (in Texas), used four separate lines for NCAA football games, broadcasting several games at once to affiliates in different regions. According to Savatiel, Host had some initial problems with old, noisy phone lines and some problems with the "choking" network, which is a device which keeps calls from coming in all at once

and overloading telephone lines. But the few snags were apparently ironed out and Host has signed up for another season of football through the 900 service this year.

The Indianapolis Motor Speedway reports will start this year with a daily call-in service on May 4. Radio stations can use the 900 number, which is only revealed to those stations which are a part of the Speedway network, to get track updates three times a day, Arnold says. There will be live half-hour reports each of the weekend days preceding the race, and the race itself will be sent over the 900 service lines for broadcast on Memorial Day (May 27).

Easy and fast

The technique is so simple that no special equipment is required for 900 service. A toll-free 800 line carries the live reports from the Speedway network to a central point in Kansas City. From there it is distributed to eight 900 nodes in Atlanta, Chicago, Dallas, Denver, Newark, Philadelphia, Pittsburgh, and St. Louis, which are re-

gional distribution points for the entire country. Radio affiliates are given a 900 number to call, and when they dial it up, they are instantly connected to one of the nodes and the feed comes through live. Most stations broadcast the reports directly from the phone line. Several stations in the same city can use the service simultaneously, as long as no more than two with the same telephone exchange are on line at the same time.

The service is not only simple, it can also be set up quickly, almost overnight, and it takes only a few hours to be assigned a 900 number.

The charge for the service is inexpensive, about \$250 to set up. Normally, callers are charged 50 cents for the first minute, and 35 cents for each additional minute. But in the case of the Indy 500, the Speedway network picks up the tab for all of the affiliates' calls.

Arnold puts the total cost for the operation of the network for the race at about \$100,000, which he says is equal to the cost of phone lines installed in past years. The network charges each

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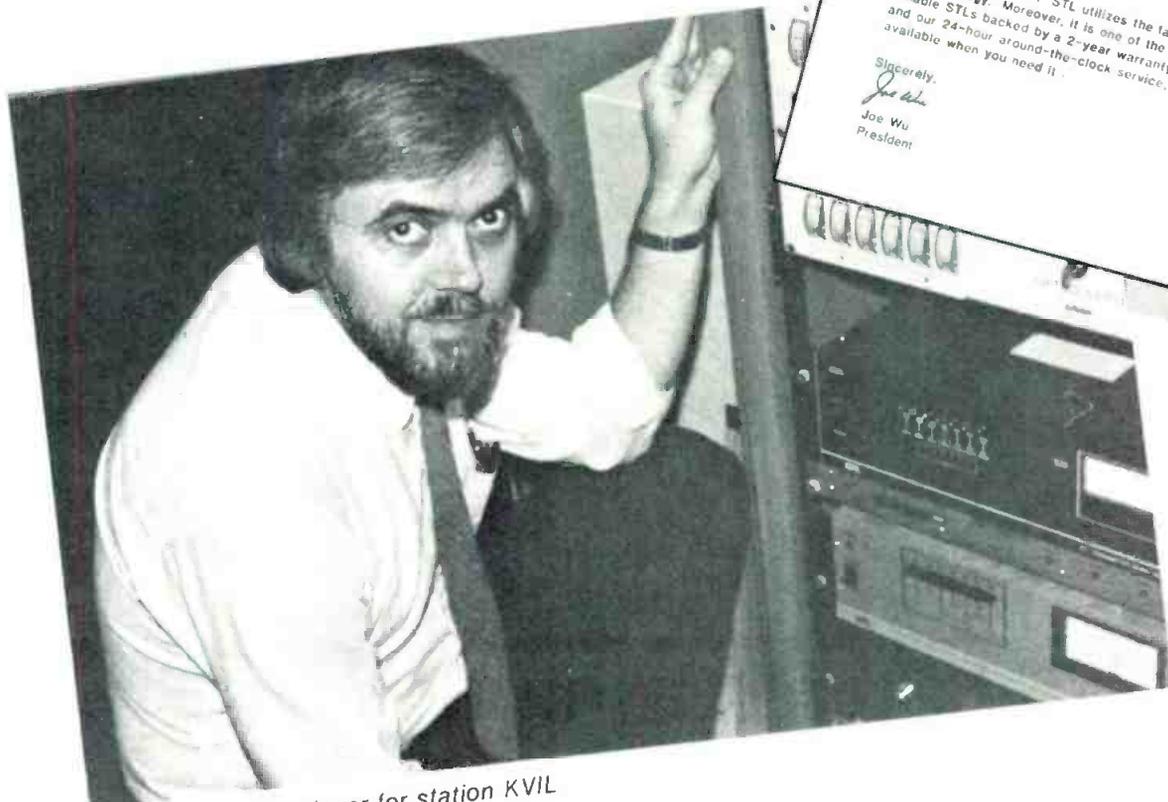
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RADIO PROGRAMMING

station what Arnold calls "a nominal fee for the complete race program," with the stipulation that the station carry the network's commercial spots. The local/national ad ratio is 50-50. Arnold says the quality of the broadcasts "were equal to or better than in past years," and that there were few technical problems.

Excellent voice quality

Savatiel says the voice quality over 900 phone lines is the same as for dedicated lines.

He does cite a few problems that cropped up last year, chalking them up to a "learning experience." The Speedway network runs a test of the 900 service about a week before it first goes into use to help stations iron out any problems with the lines. Most of the problems, however, are the result of old phone lines in some regions which have not been upgraded by the local and independent phone companies, and which are also no longer AT&T's responsibility.

There was also an instance of a local

phone company in a rural part of Texas which had never needed 900 service and had the lines disconnected. Fortunately, according to Savatiel, such problems are easily resolved. At the local phone office where the 900 service was a new phenomenon, the wires were simply plugged back in. And, in cases where old phone lines are noisy or full of static, a station can have the local phone company replace or upgrade the lines. As a last resort, a station or two with unresolvable problems can even be hardwired, just as in the old days. Savatiel also points out that network use of the 900 service will become more cost-effective once new telephone tariffs for dedicated lines go into effect this summer.

Spurred on by such an enthusiastic initial response from radio programmers, AT&T is opening the doors to additional programming via 900 service, and is showcasing it at the NAB this month. The 900 system can currently handle 24 simultaneous programs to each of its eight central nodes. That means the equivalent of 24 Indy 500

races can be sent to radio stations at exactly the same moment. An additional supplemental network is set up through Birmingham, AL, if the demand is greater than that. Savatiel says the system's capacity will be doubled as of this July, and will double again in the near future. All of that is in addition to the nearly 7000 polling calls that can be handled at the same time.

According to Savatiel, AT&T set up a total of 191 radio programs over the service last year and expects an even greater response this year. With the cost of doing business with the phone company on the rise, saving money will make Dial-It 900 look even more attractive to radio program networks. But more than a mere convenience, the 900 system may just have saved the Indy 500 for radio. Arnold and other programmers are mindful of the fact that the post-divestiture communications environment left them few options. And in the case of the ever-popular Indy 500, it was either hook up to the 900 network, or run the risk of doing without the race on radio altogether. **BM/E**

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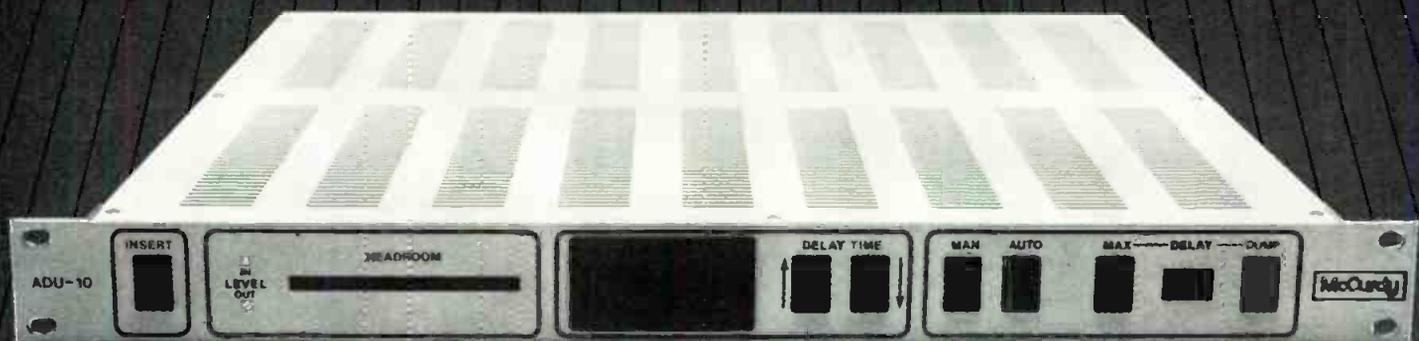
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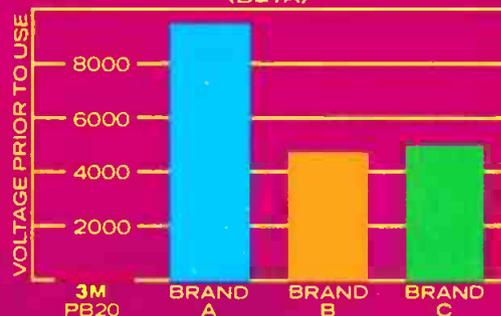
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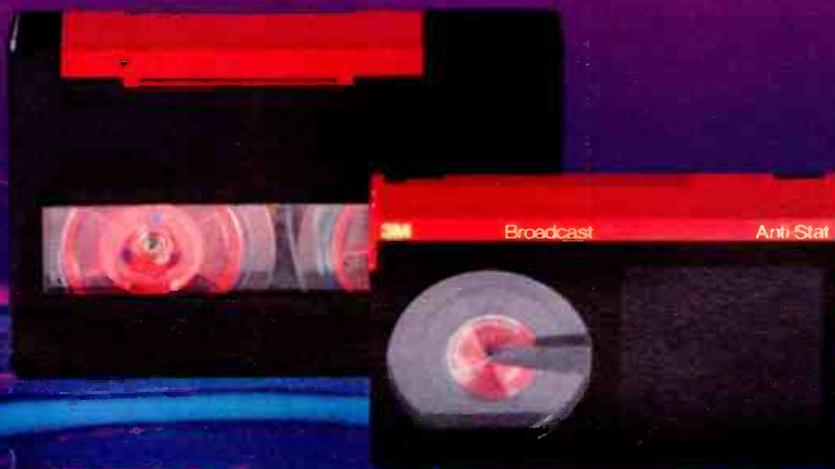
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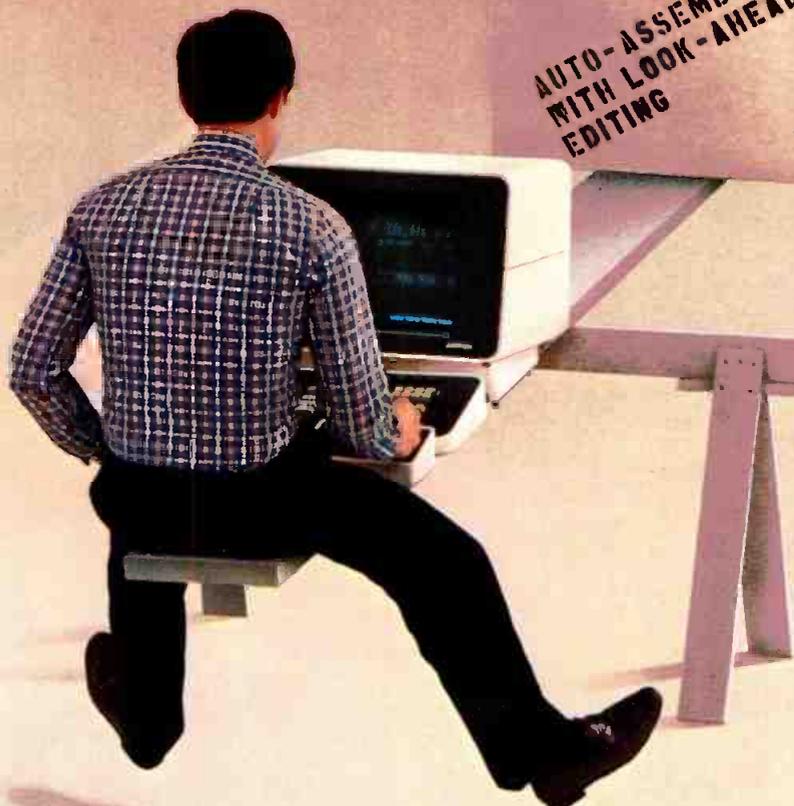
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WOR-TV Takes Competitive Edge with Upgraded Graphics

By Judith Gross
Associate Editor

Being one of three independents in a market dominated by network O&Os is not an easy life for any TV station, especially in New York. But it seemed even more so for WOR-TV when the station began a new prime-time newscast two years ago, at a time when the future seemed a bit shaky. The station had agreed to relocate to New Jersey and focus on New Jersey news in order to save its license, which was being challenged by a group trying to serve that state's public interest.

Scheduling a newscast against other stations' prime-time programming sounded like a suicide move at first, but this year the station is about to move into a brand-new \$17 million facility, enjoys superstation status by being carried on many cable systems throughout the country, and boasts the largest news operation, in equipment and personnel, of the market's independents.

Brand-new facility

To accomplish this, a number of improvements have been taking place at the station. What viewers won't see is the brand-new 110,000-square-foot Secaucus studio, and its new equipment, which VP and GM Peter Leone says alone will amount to \$5 or \$6 million of the total cost. The new facility is slated for completion in November.

What viewers *will* see is a new look to programs, promos, and newscasts that is the result of several major moves by WOR to unify and beef up its image by upgrading the station's graphics equipment.

"I don't think people tune to the station saying 'I'm going to watch because they have great graphics,' but I think the overall result is a better feeling about the station, that there's more quality, a unified look," says Leone.

To get and maintain that feeling, WOR recently purchased an NEC

Optiflex add-on for its present E-Flex DVE system at the old studios, which has the distinction of being the six-hundredth E-Flex/Optiflex system sold by NEC to date. The station has another E-Flex at Shea Stadium for Mets baseball games, and plans to install a completely new E-Flex/Optiflex system in the Secaucus facility.

Leone says that building the new studios from the ground up gave him and his engineering staff lots of time to shop around for new graphics equipment.

"We were fortunate, we could look at a variety of systems and have some time to think about it until the building's completed," Leone says. He adds that after comparing systems, "We thought the NEC was the most versatile, the easiest to use, and a system that won't become obsolete in the next few years."

Attracting outside productions

Leone's other concern in upgrading the station's current graphics capability is attracting outside production. Of the three studios the new facility will con-

tain, one will be used permanently for newscasts, one for public affairs and local production, and the third for outside production which can be booked by producers without interfering with the station's day-to-day operations, Leone said.

"You want to be able to offer them something sophisticated, if you can," says Leone, who feels the NEC equipment is state of the art.

The Optiflex upgrade to WOR's E-Flex couldn't come a moment too soon in the eyes of Neil Borrell, who directs the evening newscasts and several other shows. Borrell says the E-Flex in use now, which the station has had for about a year and a half, can only handle one channel of effects, which usually limits him to one effect at a time. He says he gets around this by recording a series of effects on videotape, freeze-framing each result as he goes along to achieve a more sophisticated end product. But he says the upgrade will simplify the process.

"Right now we're trying to make the single-channel do what a dual-channel can do," Borrell explains. "We'll do it



Danny Bucano, WOR-TV technical director, works the controls of the soon-to-be-upgraded NEC E-Flex DVE system.

TELEVISION PROGRAMMING

easier when we have the dual-channel."

Borrell says one of the main uses of the E-Flex is the small boxes which appear over the shoulders of anchors Tom



A video box over the shoulder of news anchor Sara Lee Kessler is one effect created by the E-Flex machine.

Dunn and Sara Lee Kessler during WOR's two daily newscasts. These are full-sized video frames squeezed down and positioned by the E-Flex. The newscasts also use video teasers, which are created like the small boxes, except that instead of being positioned over the anchor's shoulder they appear over a graphics background.

Two segments within the news also

use E-Flex-created effects. A "Healthline" story manipulates Chyron lettering to which drop-shadows have been added. And "World Tonight" stories use an E-Flex box of video which is flipped forward 180 degrees on a center axis, with a second frame of video appearing on the other side. Borrell says the problem with that effect is that the second frame of video will usually be reversed, so the effect is done in two steps and taped for use during the show, another process which the Optiflex upgrade will simplify.

Borrell says that news is the main use of the E-Flex equipment, with some two and a half to three hours per newscast. But the equipment has created effects for other WOR productions as well. The children's show *Romper Room* uses bumpers before and after commercials which involve a set of moves which could almost be called animation. A single piece of artwork, such as a figure with the program name or "stay tuned" message is scanned in, and start, middle, and end positions are programmed. The E-Flex compresses

the figure into infinity along the path of the preprogrammed positions, making it appear to fly in and off into the distance. Borrell says the same technique is used in reverse to return after a commercial.

WOR's E-Flex at Shea Stadium is used to display players' stats, and this year, the new equipment will be used to add some sparkle to pre and postgame shows. Borrell enjoys working the station's DVE equipment to its limit, and trying to be as versatile as possible. Some of the effects he has put into use in programs and special promotions such as the family Christmas greetings the station airs, have included sliding video frames over each other, the digitizing effect of a frame broken down into tiles which soften, and solarization, an effect which highlights the light and shaded areas of a video picture with contrasting colors.

"Most shows we do out of here use the E-Flex in one way or another, our supers are fed into it and can almost be animated, but mostly we use freeze frames with graphics," Borrell says.

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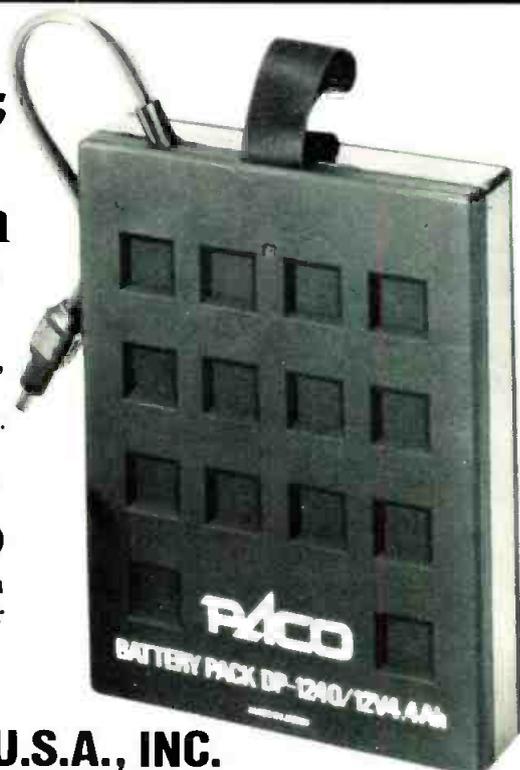
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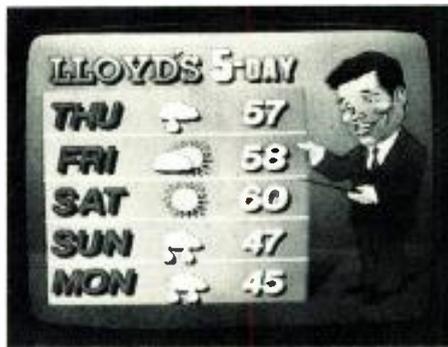
TELEVISION PROGRAMMING

New graphics system

In addition to the \$250,000 the station recently spent for the Optiflex upgrade and the E-Flex/Optiflex system for the Secaucus facility, WOR has just started to combine its E-Flex effects with a new ColorGraphics ArtStar system, also recently purchased. Artist Tom Crisp has been testing the paint capabilities of the new machine, and has come up with some unique news and weather graphics which he hopes will make the usually blasé New York City TV viewers sit up and take notice.

In addition to the usual array of weather maps, to which Crisp has added both drop and regular shadows, the ColorGraphics ArtStar will draw radar and satellite maps itself, from WSI information fed directly into it by phone. Crisp has designed clouds, raindrops, lightning and suns, but probably his most unique creation is a caricature of weatherman Lloyd Lindsey Young, a somewhat colorful figure in the flesh.

For sports, Crisp has created simple graphics which are placed over subtle color gradations. The ability to repro-



A caricature of weatherman Lloyd Lindsey Young was created by station artist Tom Crisp using the new ColorGraphics system.

duce a color in a complete range of gradations is one of the effects Crisp has used liberally throughout the newscast. One other effect worth mentioning is the ability to "write" with script lettering in real-time. The end of a restaurant review segment on the news always features a check for the meal's price, which is written item by item and totalled up, all by using the machine. That effect is taped beforehand and then inserted in the newscast. Looking ahead to the Secaucus facility, Crisp

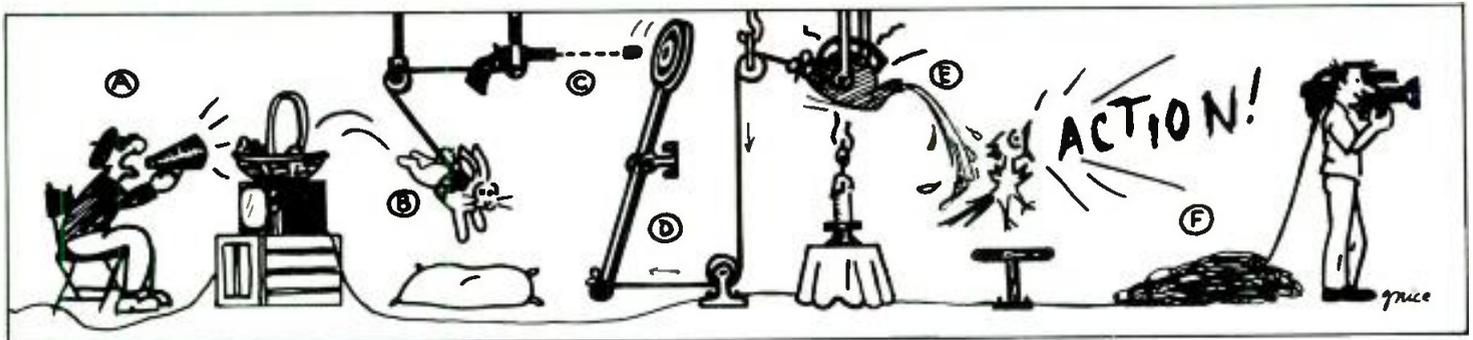
hopes to add a still store to the ColorGraphics system.

Drop-shadows, funny weather figures, squeezed video frames peering over the shoulders of a news anchor, may all seem like minor details in a station which almost lost its license, and then saved it by relocating to what many area viewers still perceive as the "back alley" of the viewing market. But they signify a deliberate decision by WOR to experiment, try something different, and spend money if necessary to win viewers and stand out among the vast menu of local news programming offered in the New York area.

"It's the details in a TV station that are most important, the little things are the things which people look at and take very seriously," Leone explains, and he says it holds true even when viewers can't quite pinpoint why they like a particular station's approach. And because it is in such a visible market area, Leone feels there is responsibility to viewers as well.

"I don't think you should ever stop figuring out how you can do it better," he says. BM/E

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FROM MATSUSHITA ELECTRIC

Circle 136 on Reader Service Card

Stereo on

With TV stereo still in its infancy, many questions remain about the interaction of audio and video. Mobile production, especially of live events, is seeking the answers.

By Eva J. Blinder, Senior Editor

While the stereo revolution has only just fought its way to the television transmitter, it has been felt in the production studio for some time. Many mobile facilities, especially those seeking entertainment gigs, have featured stereo audio consoles and stereo routing for several years.

The advent of multichannel TV sound this year, however, has taken television audio into a significant new developmental phase. The call for on-location stereo production of live entertainment events is expected to increase as stations demand more stereo product, and a whole new area of stereo production is about to open: stereo sports. For teleproduction vehicles, the challenge is clear: meet clients' stereo television needs, or face rapid obsolescence.

What those needs are, however, is still under discussion as stations, producers, and audio engineers wrestle with fundamental questions about the nature of TV stereo.

Jerry Gepner, editor in charge of NEP's New Century Productions division, says stereo became an issue for NEP about a year ago, when the company first began getting stereo sports jobs, including work for New York's Sports Channel. The demands of stereo prompted Gepner to do a lot of thinking about what equipment a truck would need to be an effective stereo contender.

"Until now, recording studio and TV production techniques have been more separate," Gepner states. "Now they're growing together." The first requirement in a stereo truck, he insists, is an audio console with large input capacity to handle the increased number of sources a stereo miking job produces. In addition, it must be capable of a full stereo mix; in other words, offer true submastering, pan pots, and left and right outputs.

"NEP is a little more fortunate than many because we're



Wheels!

relatively new," Gepner continues. The company's SuperShooters II and III, built by Lerro Corp. of Philadelphia, carry Yamaha PM-2000 boards featuring 32 inputs with eight mono outputs and a full matrixing system for all 32 inputs. Two faders are ganged together to produce a stereo master. Anticipating the need for stereo, NEP used recording-studio style equipment, dbx 160 and 165 limiting compressors, for signal processing.

"I'm finding I have to bone up on my audio," Gepner adds. "Mic selection and audio systems flow in the truck, particularly routing, become a lot more sophisticated with stereo." In particular, Gepner finds he is having to learn more about microphones. "Most of us engineers aren't intimately involved in mics," he comments. "I'm relying very heavily on the experienced freelance audio engineers I work with on a daily basis—most of whom have a very varied background—

to tell me what works and what doesn't."

Although the trucks are not completely stereo-ready at this time, Gepner says, "We have the major hardware for stereo, so we're ready." He credits this preparedness to Joe Balkan, NEP's "main idea man."

"By the end of this year I think we will be prepared to provide full stereo capabilities for almost any shoot, contingent upon when our clients want it," Gepner adds, noting that while clients are very aware of stereo, "nobody's set a date. Until that happens all of us are like runners at the starting block, ready to move but not knowing which way to go."

One concern of Gepner's is the likely eventuality of stereo split-feed work for sports. "That becomes my biggest nightmare at this point," he admits. "I'm involved with the Islanders hockey games, and as the playoffs near you get a lot of people who want feeds. If everybody goes stereo, we're going to need three days to set up the audio." A single stereo feed won't be a problem to almost any audio engineer, Gepner states, "but two or three of them . . ."

Off and running

One runner who's ready for the gun is Dick Dodson, field opera-



KWGN-TV, Denver, is ready for stereo TV production with its new Centro-built trailer, which carries a Neotek console.

tions manager for Turner Broadcasting's WTBS, Atlanta. "With the advent of true stereo—and, by the way, exactly what is true stereo is somewhat a point of debate—the key question from an audio board standpoint is does your audio board have pan pots," Dodson comments. The console in WTBS's new trailer, built by Midwest Corp. and a major focus of Midwest's 1984 NAB exhibit, most certainly has pan pots, along with just about any other feature the station is likely to need including computer automation. According to Dodson, the Solid State Logic 6000E board—the only one installed in a truck in the U.S.—was chosen for its power and flexibility.

"We knew we were headed that way," Dodson recalls. "It became obvious that we should build in stereo." First of all, Dodson points out, the SSL is capable of more than one stereo output, a necessary consideration since the station does many split feeds for Braves games. With its 32-in/out module frame, providing up to 40 mic and 60 line inputs, it can simultaneously mix up to 68 audio sources. In addition, it features patch-free audio subgrouping, allowing any fader to serve as an audio submaster with the push of a button. The board can also patch directly into an outboarded 24-track ATR if desired for multitrack recording for concerts or entertainment work.

The SSL board will be a prime ingredient in WTBS's plans to begin stereo broadcasts of Braves baseball games this month. According to Dodson, the station planned to produce all preseason games in stereo, but will not begin actual stereo broadcasts until the season opener April 12. The earlier games will allow the WTBS staff to work out the philosophies and methodologies they will use for stereo baseball.

One operational aspect that may change is the way mixes are monitored, especially for split feeds. "In mono it's not unusual for us to do both feeds out of the same truck and for one audio mixer to mix both feeds," says Bob McGee, one of WTBS's remote audio technicians. Feeds are generally mixed on open speakers in the truck's audio room. "But there's a lot of confusion and noise in the truck, even for a single feed," he points out. "If you're trying to do stereo feeds, that pretty well rules out open speakers. You need a three-eared audio man to listen to two stereo channels plus communications." The SSL board, fortunately, will allow



Built by Midwest Corp. with stereo in mind, Turner Broadcasting's new truck has an automated SSL audio console.



Audio area of Centro-built KWGN-TV truck has a Neotek audio board, Tascam reel-to-reel ATR, and ITC cart decks.



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WTBS to split up multiple feeds easily and do more than one mix at the same board. "One of the operating engineers is going to have to monitor the mix with headphones," McGee predicts. "We'll probably use stereo phones with communications mixed into one side, with a level control so the operator can raise our lower level as needed."

In terms of setup, McGee says, the main difference over mono will probably be "a great deal more attention paid to ambient miking. Quite frankly, I think that will be the first key to stereo TV. Audience and crowd reaction will be spread across the room. Announcers won't be hard right, hard left. Basically they'll be miked the same way as always and separated just slightly with pan pots. We'll use a greater number of reaction mics, probably."

Another question Dodson and McGee are facing concerns the way pictures and sound interact to form a cohesive whole during a live sports event. According to McGee, "The very real problem is that in the history of television audio, engineers have not been forced to deal in real-time with audio perspective matching video perspective." At this point, he complains, stereo TV usually consists of "stereo sound with pictures that change randomly."

McGee and Dodson intend to do things differently for their stereo baseball broadcasts—although exactly how they'll go about it wasn't nailed down at press time. "Particularly in baseball you're talking about a 360-degree animal," Dodson explains. "We'll have to find out about stereo imaging, just where to place the sound."

McGee comments, "Baseball is the only sport I know of with continuous, juxtaposed camera shots. On the windup, you cut from the home posi-

tion to the centerfield camera. That 180-degree perspective shift is something you never do in other sports, but it seems to work in baseball."

The main problem in perspective shift, McGee continues, is point source sounds. With sounds that are not clearly directional, such as crowd noise, this isn't a problem. Presently McGee is working on a software-based audio control system that will insure proper perspective of directional sounds in live sports broadcasts, although he's not ready to discuss details for the record.

Another area of interest to McGee is alternative methods of stereo transmission. He is presently conducting tests of the Ambisonics B format Surround Sound system (distributed in the U.S. by Audio & Design), hoping to persuade the WTBS hierarchy to give it a try. Although the system, already in use in Great Britain, requires the use of an in-home decoder, McGee feels that it gives the sound more of a spatial quality than standard stereo. Even with the low-power monitoring system he is using, McGee claims, "I haven't heard anything come close to this, even over this little system." Besides the Surround Sound system, McGee would like to see WTBS buy a pair of Calrec Mark IV Soundfield stereo microphones, which he calls "the most amazing single mic I've ever heard." According to McGee, the microphone allows the engineer to "define sound 360 degrees horizontally and 360 degrees vertically . . . It is very valuable just used as a stereo source. It has a real natural sound."

Too much drama?

One reason stereo imaging is such a sensitive issue, of course, is the small size of the television screen. For this reason, Roger Stauss, audio mixer/di-

rector for Reeves Teletape at the Ed Sullivan Theater, expresses some hesitancy about using stereo for sports.

"I find sports in stereo distracting," he comments. "Hockey is quite dramatic in stereo, but I'm not sure if it would distract the viewer or add to it." While he says he enjoys sports in stereo, he's not sure the majority of viewers would agree. "Screen perspective is audio perspective," he asserts. "If you have a tiny little 19-inch screen and a really big audio system, the sound's going to be much bigger on the audio system than on the set. I personally would love it, but I can't say that the average viewer would find it acceptable. I find stereo sports pickup very exciting, but I know some people who watch sports with the sound off and put a record on."

The three Reeves trucks, however, do relatively little sports work; rather, they concentrate on entertainment jobs such as *Live from Lincoln Center*, produced for PBS. The largest of the three trucks is equipped with a Neve 5114 console that can handle 52 inputs with submixers and produces eight, four, or two outputs and can separately feed each channel on a multitrack ATR. According to Bob Eisenstaedt, mobile account executive at Reeves, the board was installed lengthwise in the truck to allow maximum speaker separation. The audio portion of the truck, which was built by Reeves, was put together by Stauss, George Bennett, and Timmy Lester.

Stauss cites a recent stereo job as an example of the capabilities of the two-year-old truck. For a performance of Andrew Lloyd Webber's *Requiem* at St. Thomas Cathedral in Manhattan, the company supplemented the Neve board in the truck with three portable Neve 8x2 mixers. Several different feeds were needed: one for the BBC, a multitrack recording for Webber, and a simultaneous two-track mix. According to Stauss, the audio crew combined miking techniques to satisfy the different clients' requirements, using a total of about 40 mics with a main stereo pair above and behind the conductor, plus close mics on instrument groups and soloists. The close mics fed the multitrack recording, while the BBC sound mixer relied primarily on the spaced pair.

Although stereo is causing technical changes, primarily in the area of updated equipment, Stauss notes, "People have been doing stereo television for quite a while." Through



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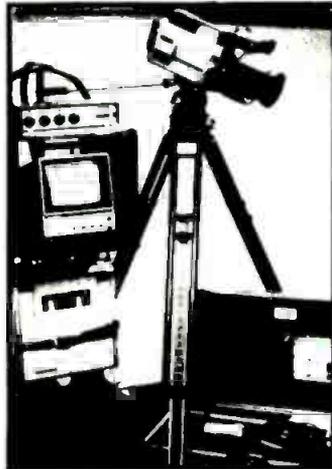
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Reeves, Stauss is involved in the studio production of *Kate and Allie*. "It's produced in mono," he says, "but in the control room we record all the audience reaction tracks and keep them on the shelf for the future," in case the producers ever decide to resweeten in stereo. "It's so much funnier in stereo," he adds.

Stereo sports

Until now, the real pioneer in stereo sports has been ESPN of Bristol, CT. The cable channel, which supplements its own fleet of five trucks with other trucks rented at sports locations around the country, started experimenting with live stereo production of sports about two years ago. Around that time, it also upgraded the audio sections of its vehicles.

"At that point, we were looking at our basic audio and video signal with the thought of improving it," explains Reggie Thomas, ESPN's vice president of operations and engineering. "In television, the concentration has always been on the video signal. We've squeezed it, flipped it, tumbled it, and developed graphics capabilities. We saw a weakness in the concentration on the audio signal. In addition, we realized the networks were looking into stereo.

"Another factor was that we felt that with mono audio, viewers were missing the real feeling of being at an event," he continues. Stereo was seen as a way of "not just creating a left and

right, but giving more of a feeling of presence—the feeling of the swishing of the skates in hockey, or the squeaking of the sneakers in basketball."

The first requirement, from the hardware standpoint, was "solid audio hardware" in the trucks. Originally built several years ago by Compact Video, the trucks were outdated in the audio area. ESPN engineers went to work, therefore, rebuilding the audio sections with new semi-custom Neve audio consoles. Each board has a minimum of 24 inputs with eight submixers and four masters.

To determine the feasibility of stereo sports, director of engineering Mike Negri conducted a series of tests in off-side facilities set up during broadcasts of various sports events. "We didn't want to change our entire operation or double our manpower," Thomas admits. The tests also helped ESPN decide which sports were enhanced most by stereo.

"We found that the degree of the dimension added depended on the nature of the sport," Thomas notes. Hockey, for example, was very effective, as were other sports in which the action is predominantly of a left-right nature. Tennis, on the other hand, has a more front-to-back nature, making the advantage of stereo a little less.

According to Negri, the key to live stereo sports production is planning.

"For some games, you don't have time to react," he asserts. "Hockey is very fast, for example. You need to

have the board preset because you don't have time to bring the fader up or down. Having a highly skilled operator always helps, but the real way to cope is preplanning—knowing the event you're covering and making the decisions *before* the whistle blows. If you hit the pan pot and try to make a mic sound like it's going from left to right, it not only sounds phony, but it leads you into riding pots like a maniac." He and Thomas agree that minimizing on-the-fly operator decisions through preplanning and setup is essential to insure not only smooth operations, but operators' sanity as well.

"We proved that you can set up your console and, hands-off, let it ride," Negri states. "But if you try to improvise . . . then you're in trouble." One problem area can be announcers, who Negri describes as "temperamental." He explains, "They work in an open booth, and when they hear the crowd react and the sound level go up, they try to get on top of that. Their levels are always changing," making it difficult for an audio operator to control.

The new concentration on stereo audio has had the beneficial side effect of improving mono, Thomas and Negri note.

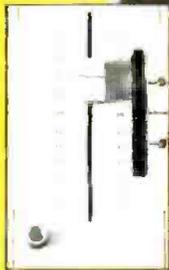
"When you're producing anything in stereo," Negri says, "you also have to keep track of what your mono is doing because 99 percent of the people will be listening to your mono feed." Besides being the program mix most viewers will hear, the mono mix is needed to monitor stereo for phase errors and other problems. According to Thomas, the care taken to produce the stereo "gives us a far superior mono output."

Stereo awareness

Other owners of new teleproduction trucks share an awareness of stereo. A good example is San Francisco-based One Pass Film and Video, whose Mobile One trailer was christened with champagne at the Centro NAB booth last April.

According to George Palmer, chief engineer, "The truck was designed for stereo from the start." The 24-in, 16-out Auditronics 710 console is set up for stereo distribution, feeding ROH stereo audio DAs and dbx 160X stereo limiters. It is capable of many working configurations, including multitrack recording. Other audio equipment on board includes a Yamaha submixer, Otari reel-to-reel ATR, and Teac cassette deck.

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A critical consideration in building a stereo truck, says Palmer, is keeping track of phasing throughout the system. "At every point the outputs must be in phase," he states. "We carry with us a Tektronix 2445 oscilloscope to analyze x,y components of the stereo signal to tell us instantly whether a given signal is in phase with its mate." When they accepted the truck from Centro, One Pass engineers did a wire-for-wire check of phasing throughout the truck and verified the phase of all equipment; very few phasing problems have occurred as a result.

According to Ruth Scoville, director of operations at One Pass, the truck has been doing stereo jobs since its inception. Its first shoot was the Olympics; recent stereo jobs have included the American Ballet Theater and the Cinderella ballet at the San Francisco Opera House. Huey Lewis and The News at the Kabuki Theater in San Francisco, and the Philadelphia Orchestra at Ambassador College in Pasadena. The American Ballet Theater job, done in conjunction with Westwood One, involved digital recording techniques as well as Dolby stereo and non-Dolby stereo (as backup).



Reeve's Teletape's largest truck, used for Live from Lincoln Center, carries a Neve 5114 console.

For the Huey Lewis shoot, a similar situation existed. According to Palmer, "Westwood One did the mixing in their truck and fed us the stereo track. It was Dolby and non-Dolby, plus digital tracks they recorded on modified Sony U-Matics." The complexity of the audio required a dedicated operator just to monitor the quality control feed, which

decoded the encoded digital and Dolby signals to check that the enhancement was done correctly and introduced no distortion. According to Scoville, working with a separate audio truck is still the norm on many entertainment jobs. "Our audio system usually gets us through beautifully on smaller shoots," she says. "But most major

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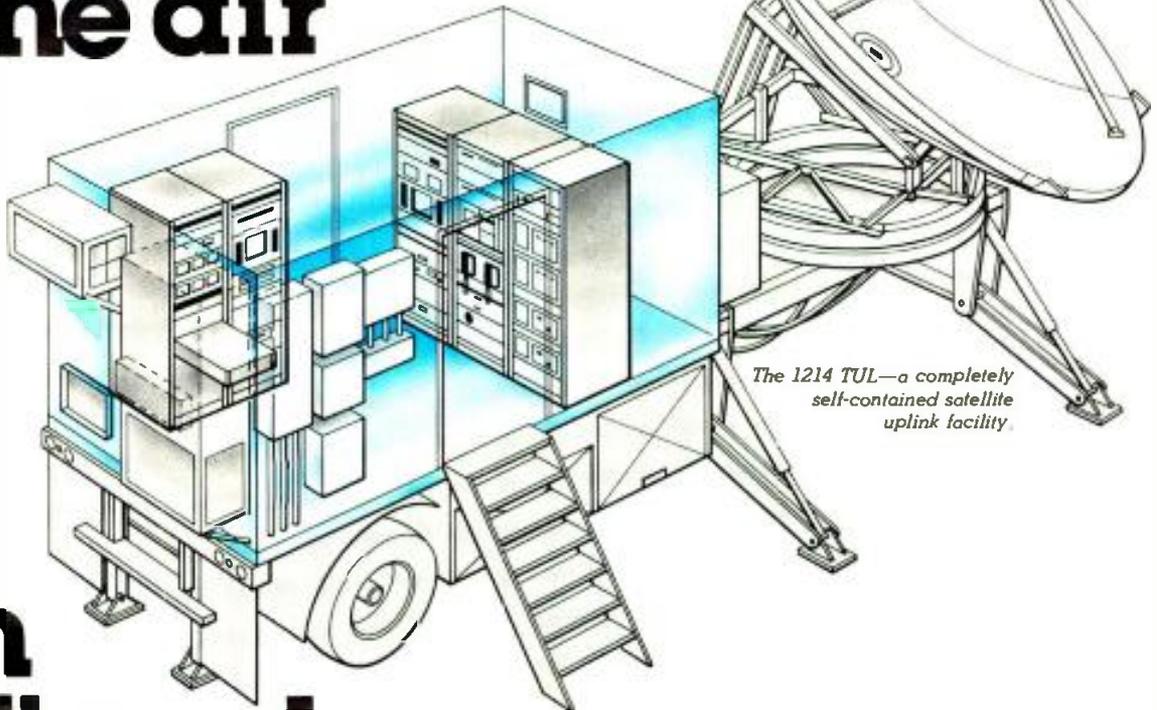


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shoots that are really concerned about audio tend to bring in an audio truck with 24-track record capability."

Even so, truck operators are not skimping on audio these days. The Eagle I trailer, owned by Multimedia Entertainment of Cincinnati, went into service last September with a state of the art audio section built around a stereo-capable, 36-input Audiotronics 700 Series console. According to Multimedia's Bill Spiegel, the audio room is big enough to hold two operators, a necessity for jobs such as the recent 1984 Music City News Country Awards, which the truck produced in Nashville. The console is capable of mixing directly to 24-track, and inputs for a 24-track deck are available on the truck for such an eventuality. Standard audio equipment includes a Tascam two-track reel-to-reel deck and Tascam stereo cassette deck, plus ITC cart decks.

Spokesmen for truck manufacturers agree that stereo is a fact of life. "Nobody would spend two million dollars on a truck and not equip it to do stereo," insists Chris Summey, vice president and systems division manager for Midwest Corp., which built the

Multimedia truck as well as the new WTBS truck. "All trucks we've built in the past few years have had stereo boards, from 30-foot straight body trucks to 45-foot trailers," he continues.

Ken Tondreau, a designer with Centro Corp., says, "The trucks we've built recently are all designed to accept and send out stereo feeds. As far as distribution and transmission of signals throughout the vehicle, it's all stereo." Both Tondreau and Summey point out that while manufacturers' philosophies on stereo have been fairly consistent for several years, customer awareness has increased sharply in the past year. "Now, people are coming to us and saying, 'I want it to do stereo,'" Summey adds.

Concert imaging

According to Bob Bemis, general manager of Clarion Remote Television, the problem of stereo imaging is easily solved in concert broadcasts, where the aim is to produce a balanced orchestra sound that reproduces, as much as possible, what an audience member would hear in the concert hall.

"If we were to go in and focus tight

on the lead violin, it's probably because he's playing a solo," Bemis explains. "You're not going to hear the brass anyway. The orchestra tends to make those perspective changes for us and we follow what they're doing."

The CRT truck, which was built a year and a half ago by Roscor Corp. with the intention of producing stereo telecasts, will have a major job next month when it produces the Chicago Children's Symphony Orchestra competition on May 7 for nationwide telecast in stereo over PBS. The heart of the truck's audio section is an Audiotronics 750 console with 36 inputs and 24-channel output for multitrack work. The flexible board allows the audio mixer to do things "just about any way he wants to," Bemis boasts. The truck also has full stereo routing. In addition to concert work, the truck has done a number of live stereo sports jobs, some involving split feeds, for ESPN.

For live sports, Bemis says, the common practice of locating mics physically on top of the cameras is a great aid to live mixing. "That way," he states, "the audio guy can have the mic on that camera ready to go on cue." Another useful technique Bemis employs is to

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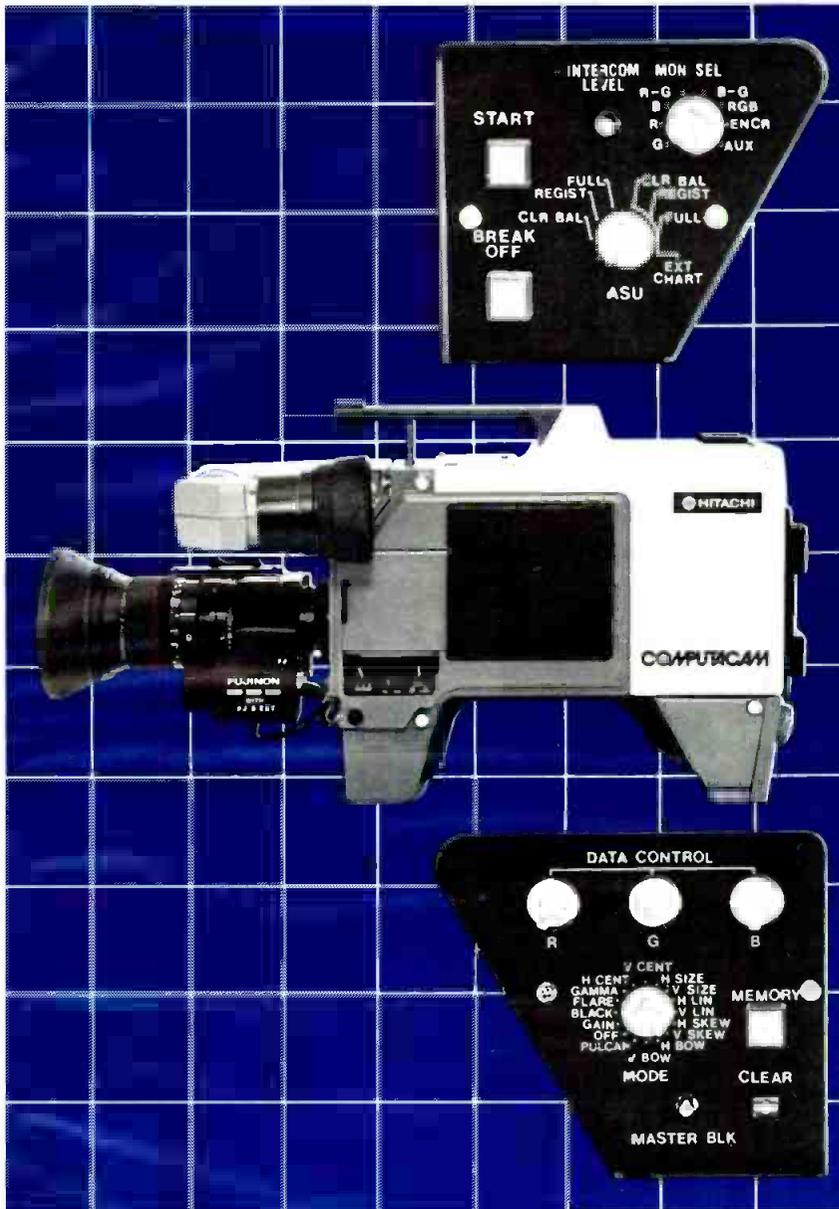
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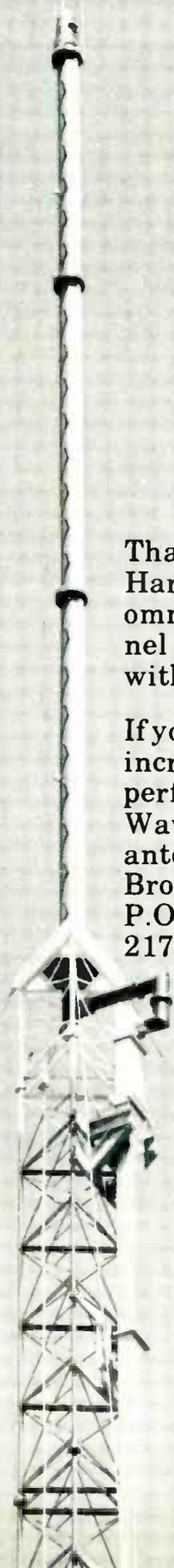
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But the secret is not so well kept. Other broadcasters have discovered they can have all these benefits and *still* get elevation and directional patterns to meet their needs. WHRO, Norfolk, Virginia; KPBS, San Diego, California; WSRE, Pensacola, Florida; and WSMH, Flint, Michigan are others on the growing list of stations transmitting with a Harris Wavestar. Because it's made of waveguide, the Wavestar's power handling capability can be as much as 300% higher than conventional coaxial antennas.

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Please take a moment to fill out the form below so we can plan even better coverage of mobile production equipment and services in the future

1. Indicate your status on the following types of studio cameras, lenses, and support systems. Please use the boxes to indicate how many of each type of equipment you have now or intend to buy:

	have now/ on order	intend to buy			no plans
		within 3 mos.	within 6 mos.	within 12 mos.	
ENG microwave wagon	<input type="checkbox"/>				
ENG van (microwave, camera)	<input type="checkbox"/>				
EFP van (one to three cameras, VTR)	<input type="checkbox"/>				
25-35 foot EFP truck	<input type="checkbox"/>				
40-45 foot EFP tractor trailer, camera equipped	<input type="checkbox"/>				
35-40 foot EFP tractor/trailer, VTR graphics equipped	<input type="checkbox"/>				
Small audio production unit	<input type="checkbox"/>				
Large audio production unit	<input type="checkbox"/>				
ENG-equipped helicopter	<input type="checkbox"/>				
ENG-equipped all-terrain vehicle	<input type="checkbox"/>				
Transportable satellite uplink	<input type="checkbox"/>				

2. On a scale of 1 (not important at all) to 10 (extremely important), how do you rank the following features of mobile units when evaluating them for purchase?:

	Importance (1-10)		Importance (1-10)
Chassis design, suspension	_____	VTR section	_____
Interior design and layout	_____	Production/switching area	_____
"Creature comforts" (seating, etc.)	_____	Technical area (DAs, routing, etc.)	_____
On-board audio equipment	_____	Communications system	_____
Camera control section	_____		

3. About outside mobile production units:

If you rent mobile production units from outside facilities companies, how many times a year do you rent? _____
 What is the average number of days for each rental? _____
 Which companies do you do business with most often? _____

4. About the story on mobile production in this issue:

Did you find it informative? yes no not sure How long did you spend reading the story? _____
 Did it contain enough detail? yes no not sure Will it influence your buying plans? yes no not sure
 Did you read all of it? yes no not sure
 Did you pass the story on to anyone else? yes no If yes, their title(s)? _____
 General comments about the story: _____

5. About mobile units advertised in this issue:

Which truck ads stand out most in your mind? _____
 Will any ads influence your buying plans? (specify) _____

6. About yourself:

Do you work at a TV station? TV network group HQ? Teleproduction facility? Production company?
 Radio station? Radio network group HQ? Other (specify) _____

Are you a: Chief engineer? Engineer? Production manager?
 Studio manager? Engineering manager? Station owner/manager?
 Operations manager? News director? Other (specify) _____

Do you actually use the equipment? make suggestions about what equipment to buy? evaluate what equipment to buy? actually make the buying decisions?

NAME AND TITLE _____

STATION OR COMPANY _____

ADDRESS _____

CITY, STATE, ZIP _____

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MAIL BEFORE APRIL 30, 1985

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have one or two parabolic mic operators following action from the sidelines. "If the audio guy's sharp and sees that the linebacker is coming up to one of the cameras, he can crank up the sound on the parabolic mic so that when the player comes in, he smacks right into the camera" for a dramatic visual and aural effect. Even so, miking for concerts is more complicated than for sports, Bemis claims. "Quarterbacks don't talk in stereo," he explains. "Players don't play at both ends of the court at the same time. The point of interest is the action."

The video connection

While discussions of TV stereo have naturally concentrated on audio equipment, video is bound to enter the picture sooner or later. In a sense, one-inch C-format video recording helped pave the way for television stereo by incorporating two dedicated audio tracks. According to some users, however, VTRs' audio sections can occasionally cause problems.

Dodson, for example, has experienced minor phase differences among different recorders (the WTBS truck uses Ampex VPR-2s). Because of these

differences, Dodson says, "You can't necessarily take a tape recorded in stereo on one VTR and have it sound right on another machine." McGee agrees and comments that the tolerances to which VTR audio heads are built often don't come up to the standards of a good ATR. "Of the one-inch machines we have in our trucks, probably no two are exactly the same," he says. "There isn't the same amount of difference, so to speak, between any of them." The differences are small, he admits, and generally not noticeable.

Although One Pass's Palmer hasn't noticed any phase problems with the truck's Ampex VPR-3s, he notes that the company is currently updating the audio circuits on the machines in response to suggestions from users.

"I've encountered all kinds of small audio problems with videotape machines," Stauss comments. "I haven't had real bad results, but I wouldn't use videotape as a master source." He personally hasn't run into phasing problems, although he says he is aware of their existence.

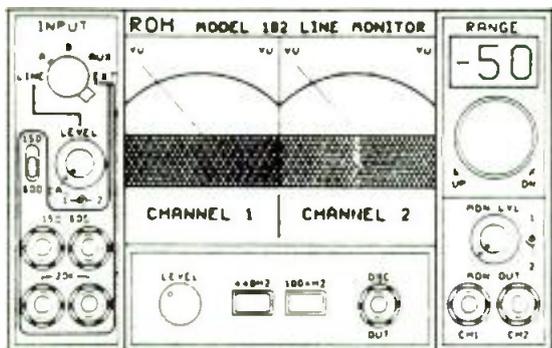
Personally, Stauss would like to see really high-quality audio circuits incorporated into one-inch VTRs, perhaps

something similar to the hi-fi audio systems for high-end consumer VCRs. "The dynamic range and sound quality of those systems equals digital," Stauss says. "If they could standardize studio machines with that kind of circuit it would be great, but I don't know if they can squeeze all that information onto a piece of videotape."

Audio ascends

Whatever new turns TV audio takes, it seems evident that its direction of movement is up. Television engineers, often turning to experienced audio people for guidance, are learning about quality sound and applying their newfound knowledge to mobile as well as fixed applications. The result can only be of benefit, not only to producers and stations but also to the audience. In the words of Dick Dodson of WTBS: "The best part about all of this is not necessarily that television is going to be stereo, but that finally audio is being treated with as much concern as video. Sound at home is going to improve tenfold . . . It's going to be real interesting to see where we're going to take it. We're feeling our way with this just as with anything new." **BM/E**

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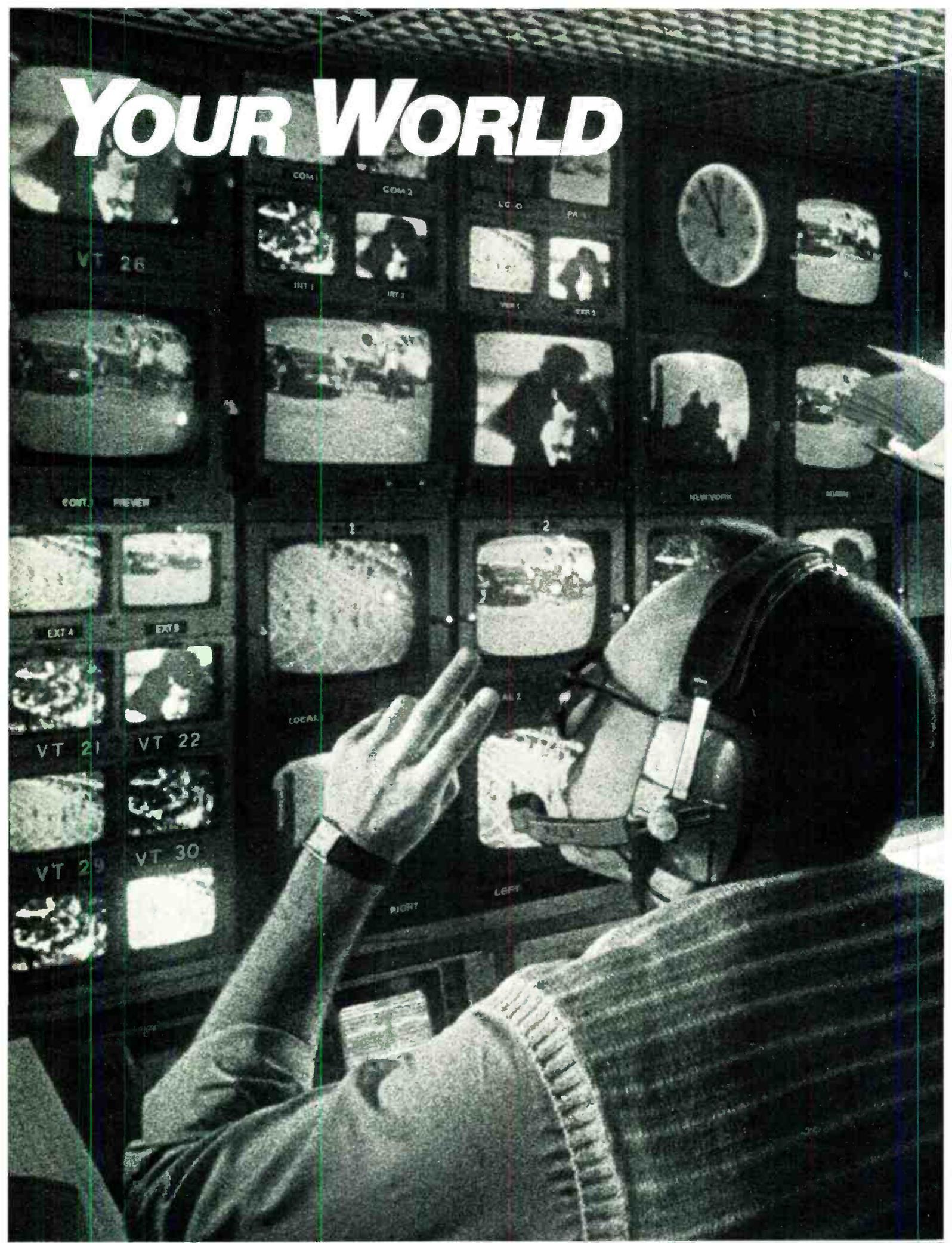
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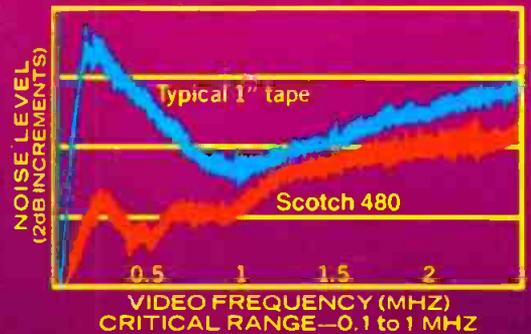
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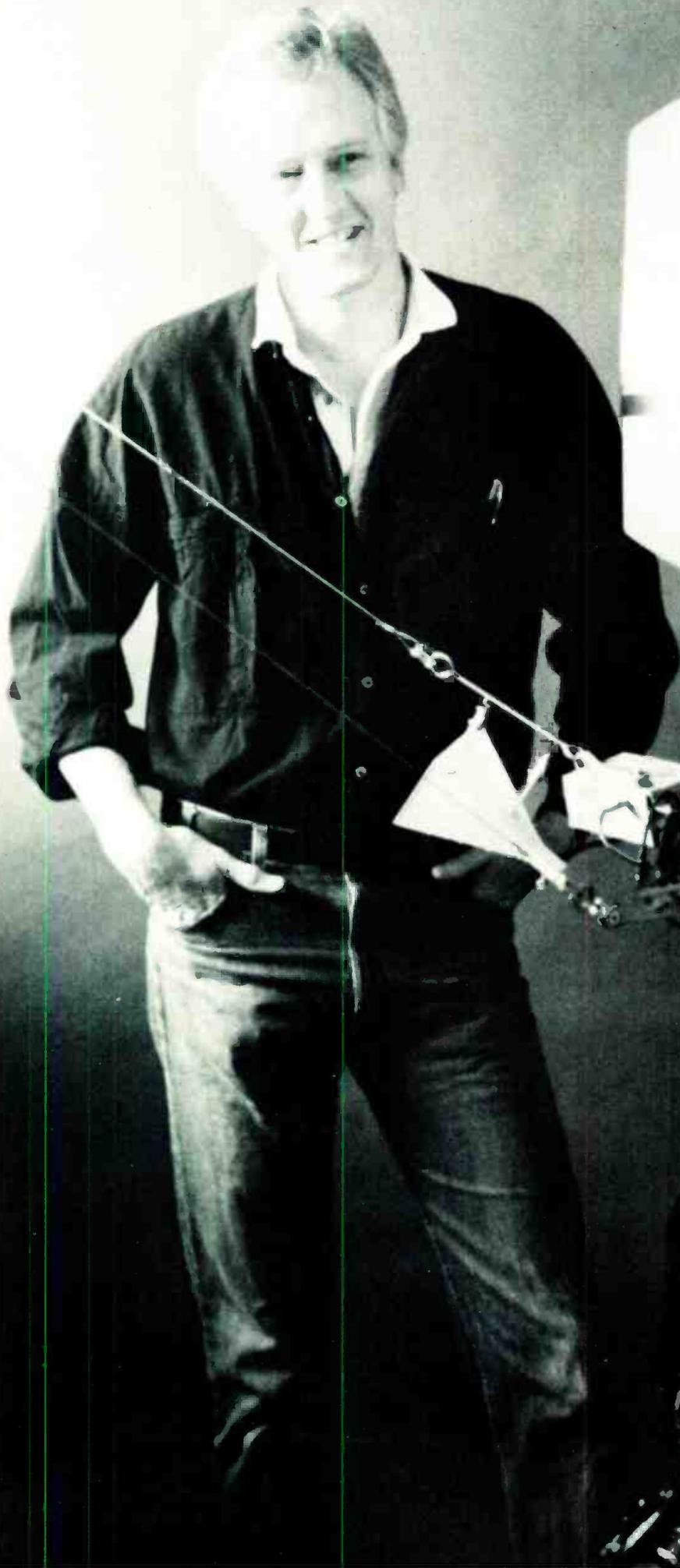
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Remote-Control Pan & Tilt:

AUTOMATION

For more than a decade, remote-control camera systems have been eyed suspiciously by the broadcast world. Even those who conceded their possible uses and merits wanted no part of them in day-to-day operations.

But just recently, some advances in technology and design and a reordering of programming priorities have caused broadcast engineering and production people to take a second look at remote camera equipment. Now, manufacturers of systems have begun to respond with new offerings aimed particularly at the ENG market, and if their assessments pan out, this could be the year remote camera systems find their place in the sun among broadcasters—starting with and gathering momentum from this month's NAB show.

The first remote camera systems were introduced into the U.S. in the 1960s, but their designs, as well as their expensive price tags, made them impractical for all but the most elaborate productions. Many directors and producers who did venture to try remote controls found fault with the servo

In the 1970s and 80s, however, the demand for increased production value—particularly in sports and EFP where a premium is placed on getting the "tricky" shot—has meant a rebirth of interest in remote control.

A camera operator getting a shot from a football goalpost

TAKES

or basketball backboard is risking serious injury; but with a remote system, such angles are not only easy, they are also quickly becoming commonplace.

New approaches

To meet what now looks to be a growing demand for remotely controlled pan/tilt heads on the broadcast front, several equipment manufacturers have redesigned their original systems with a broadcast slant. This has meant the elimination of many "extras," and as a result, scaled-down costs. But more importantly, there have been two major technical improvements which have increased

both the reliability and performance of remote systems.

First, microprocessors have been incorporated into control units, allowing for ease of joystick controls, the ability to preprogram and store shots and shot sequences for later recall, and for the control of several cameras remotely simultaneously, even over long distances.

CONTROL

mechanisms and primitive potentiometers which caused jerky or rough camera movements. Many also wondered what possible use such systems could have in newsrooms and other production areas where there were already camera operators to keep precise control on pan, tilt, zooms, and the like.

Cameras shooting video from basketball net backboards, even cameras which "fly" through the air, have become a reality with the growing sophistication of remote-control systems. And this could be the year such systems finally gain widespread acceptance.

By Judith Gross, Associate Editor

Steadicam inventor Garrett Brown stands beside his latest achievement, the Skycam.

Secondly, analog servo mechanisms have begun to be replaced by digitally controlled servos, allowing for greater accuracy of movement.

In a new remote-control head from Vinten, for example, the user is offered a choice of either analog or digital servos. According to Jack Littler, president of Listec, Vinten's marketing branch in the U.S., the user who opts for the digitally controlled servos can specify the precise degree of accuracy in any particular head, depending on how it is to be used. Positioning accuracy rises in 10 percent increments, with each rise in accuracy matched by an increase in price.

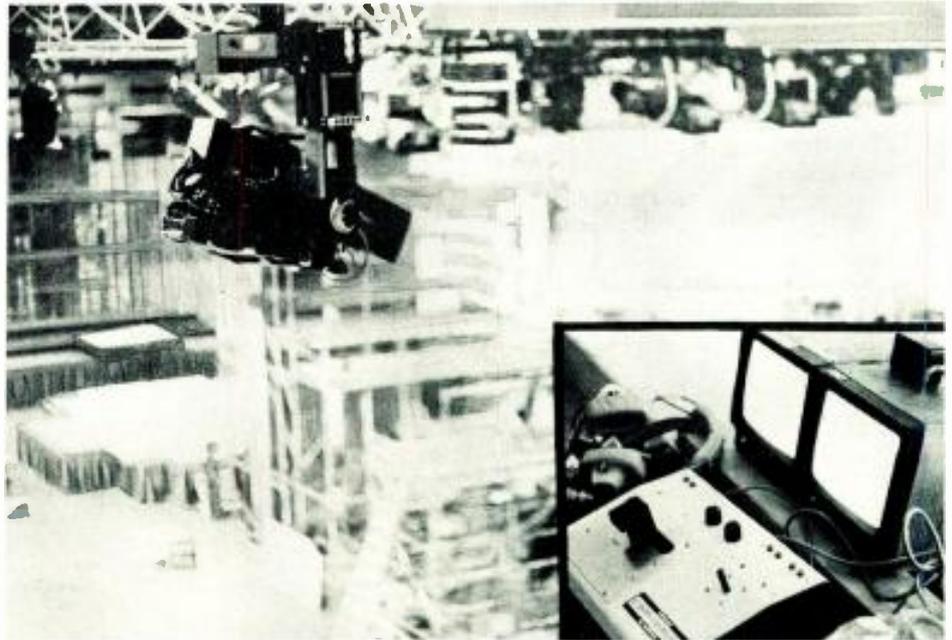
Increasing use

Because of such advances, remote-control camera systems have recently found their way into such events as the Olympics coverage (ABC), football, and basketball games, and interest at both the network and local station level is growing. Some broadcasters were voicing their interest as early as last year's NAB, where remote systems designed specifically for TV uses were sparse. That's expected to change rapidly with some new systems about to make their debut. And, in addition to those systems designed for ENG and EFP applications, there are even some systems with almost fantasy-like capabilities: one system, for example, "flies" through the air; another acts like a periscope, probing into miniature scenes and recording them in "life-size" scale.

At least four manufacturers were poised to head into this month's NAB showcase with remote-control systems aimed exclusively at broadcasters and designed with ENG/EFP cameras in mind. In some cases these are brand-new designs, and in others they are streamlined versions of more extensive systems originally designed for film production.

W. Vinten Ltd. has been marketing its microprocessor-controlled Digital Remote Camera Control System (DRCCS) for some time. Originally designed for the BCC, which Listec's Littler claims "always wants every possible feature," the system seemed far too elaborate for the U.S. broadcast market and received little interest on this side of the Atlantic.

But Vinten and Listec are betting that the increased demand for cameras which can be mounted in unusual or dangerous locations will open the market up this year. It's on the basis of this



Last year CBS used ceiling-mounted, motor-driven Cam-Remote Systems from Matthews Studio Equipment at the Republican Convention in Dallas. Matthews now has a new system designed for the TV market. Insert shows control console.

prediction, according to Littler, that Vinten now has a scaled-down version of the DRCCS, the Microswift 200.

"What we've done is drop the master/slave option and compress the design down to only three or four PC boards," Littler explains. The result is a system which is small enough to fit all of its electronic components into the desk on which it sits. Other than the system's size and the lack of a master/slave option, Littler says the functions of the new version are the same as the basic DRCCS. These include pan/tilt, zoom/focus with a lens drive modified but not made by the company, pedestal height, and shot storage. A 10-shot memory is standard, with options for either 30 or 99 shots total.

The Microswift operator panel can be fitted with joystick controls, one for pan/tilt and a separate one for zoom/focus. The control panel is connected to a panel electronics module (PEM) via a multicore cable, and is responsible for all control functions and communications to the servo controls at the remote site. The servo communication is done via a serial data link which can be a connecting cable or modem link.

As explained above, the servo controls on Vinten's system have been redesigned and are digital, although a buyer who doesn't need such precise accuracy can opt for the standard potentiometer servos at a lower cost.

The Microswift 200 can operate up to nine cameras through the use of modems and multiplexers, with a separate control panel for each camera

hooked up to the central control unit (CCU). Control signals can travel over very long distances through telephone lines by using a modem interface.

Electronically, Vinten is offering one of the most sophisticated remote camera systems on the market today, and such a reach toward higher capabilities causes it to be at the high end of the price scale. But the broadcast system has also been scaled down in cost from the DRCCS, and Littler believes it is competitive with other broadcast systems on the market, at under \$50,000 per camera.

According to Littler, ABC has shown a great deal of interest in the Microswift. He says the network has tried it out on evening newscasts and will be using it again after NAB.

"It's very encouraging to see a network like ABC—which has always been a leader in such things—express interest in such a system," says Littler, adding that interest has also come from NBC, which recently computerized its news operation.

Another manufacturer already having a remote camera system on the market but now specifically targeting broadcasters is TSM (Total Spectrum Manufacturing). TSM's microprocessor-controlled HS-100P has found widespread acceptance mostly in teleconferencing, according to Bob Gonnelli, vice president of marketing, who estimates that about 250 units have been sold to date.

But Gonnelli says that Boston public TV station WGBH recently bought four

320.

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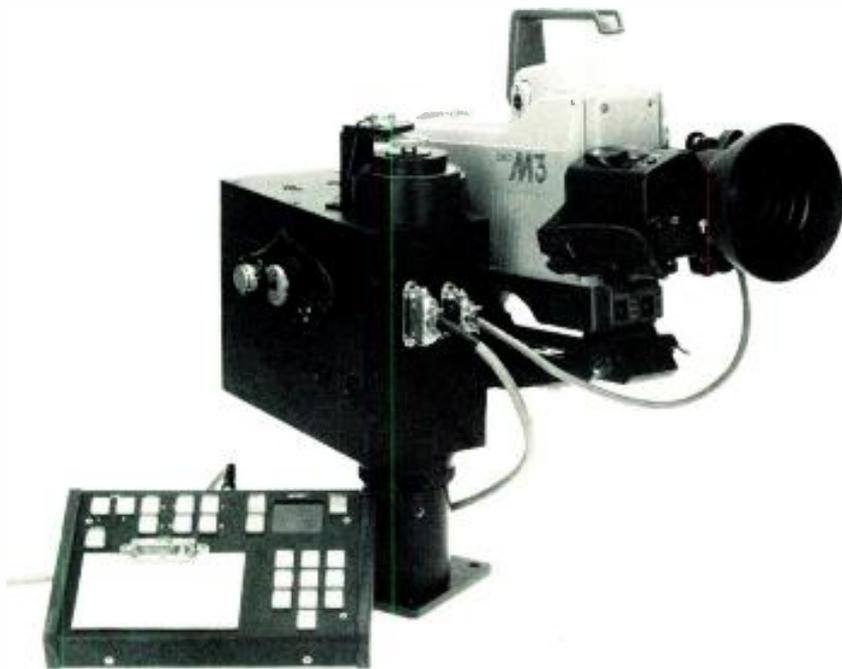
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TSM Inc. has designed a streamlined, four-camera version of this HS 100P microprocessor-controlled remote system for broadcast use.

systems to carry state legislative proceedings, and that has set the stage for TSM to shift some concentration to the broadcast market.

The result is a new version of the HS 100P which can control up to four cameras remotely, with news automation, weather, and sports applications the intended targets.

The original system consists of a pan/tilt head, separate zoom/focus lens servo, and microprocessor controller. Up to 100 positions can be preset and randomly recalled from its nonvolatile, EPROM. The biggest difference in the broadcast version is a greater storage capability, allowing 100 shots to be stored and randomly recalled from each of four cameras. In addition, each camera is allowed five special motion memories, each of which memorizes up to two minutes' worth of movements created by an operator.

Another added feature is a proportional rate joystick, which times both the pan and tilt motions to begin and end simultaneously. Gonnelli points out that this allows for smoother motion, because the move is completed at a continuous 45 degree angle, instead of the usual 90 degree horizontal/vertical jerking action.

The new TSM system, which doesn't have a name yet, will be officially introduced at the NAB. The four-camera controller is approximately \$15,000 with a \$6800 pan/tilt head and \$1100 zoom/focus lens drive needed for each camera in the system. Gonnelli

believes small market stations will be attracted by the multicamera capability. He cites 24-hour music video stations which use locked-down cameras as one possible buyer, adding that TSM has already installed a remote system at WVJV-TV, Boston's new music video station.

Shift in focus

One remote system manufacturer which has been focusing its attention on the film and major production market is Matthews Studio Equipment. The company's Cam Remote system is a pan/tilt head with zoom/focus lens drive which also controls camera functions such as iris and color balance. Designed by E.F. Nettman, it is a motor-driven system with motors at the control head powered by solid-state amps to form a motorized servo loop. With the ability to be mounted to all types of elaborate fixtures, such as a Tulip crane or the huge Sky Cam overhead crane, the Cam Remote was obviously aimed at motion picture production.

But when CBS employed four Cam Remotes in ceiling mounts for the Democratic and Republican conventions last year, the potential for a broadcast market came to light for Matthews. Now the company has a smaller remote system designed for EFP cameras, which it calls Sports Cam.

The new system incorporates most of the functions of the Cam Remote, but in a smaller, scaled-down design. It has a pan/tilt head and zoom/focus drive.

But while Cam Remote can pan 360 degrees and tilt 360 degrees continuously without tangling its cables, Sports Cam can only tilt one 360 degree rotation. It does pan 360 degrees, however.

The rest of the equipment consists of an operator control console which is connected via coax cable to the camera. Matthews president Ed Philips says the company is developing a microprocessor for the control unit which will give it the capability to store or preprogram shots; currently the system must be programmed from a separate computer through an interface, which has been done with the Apple II, Philips says.

Matthews has never really been in the business of selling remote camera systems, preferring to rent them instead. Philips says the same will be true of the Sports Cam, which will be rented short-term or leased long-term directly to broadcasters or through camera rental outlets for around \$600 per day (excluding camera).

Another company which has been supplying equipment to the film industry but seems ready to change its directions somewhat is Cinema Products. The company showed a preproduction model of a remote pan/tilt head at last year's NAB and then introduced a production model at November's SMPTE show. Cinema Products' system is called Mini-Mote, and VP/GM Ed Clare says it has been designed for ENG/EFP cameras.

Manufactured and distributed under license from Matthews and Nettman, the Mini-Mote is ac or dc (24-30 V) powered. Functions include 360 degree pan and 270 degree tilt, with a separate lens accessory available for zoom/focus control. The Mini-Mote allows up to 200 feet of separation between controls and camera.

Like Matthews, Cinema Products also wants to rent out the system for commercial use, at \$425 per day. But Clare says the Mini-Mote can be purchased at a cost of \$24,000 for the pan/tilt system, and \$3000 for the zoom/focus accessory.

Clare envisions the greatest interest in the Mini-Mote coming from EFP applications, especially in dangerous or difficult locations. "An audience at a rock concert" is one example he cites. But he doesn't see the overwhelming interest in remote systems that some manufacturers have forecast, mostly because of cost considerations.

"The economics of such systems are starting to weigh on everyone's mind."

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In early December of 1984, the new Clearwater Teleproductions, Inc. mobile unit took to the streets—and the heads began to turn.

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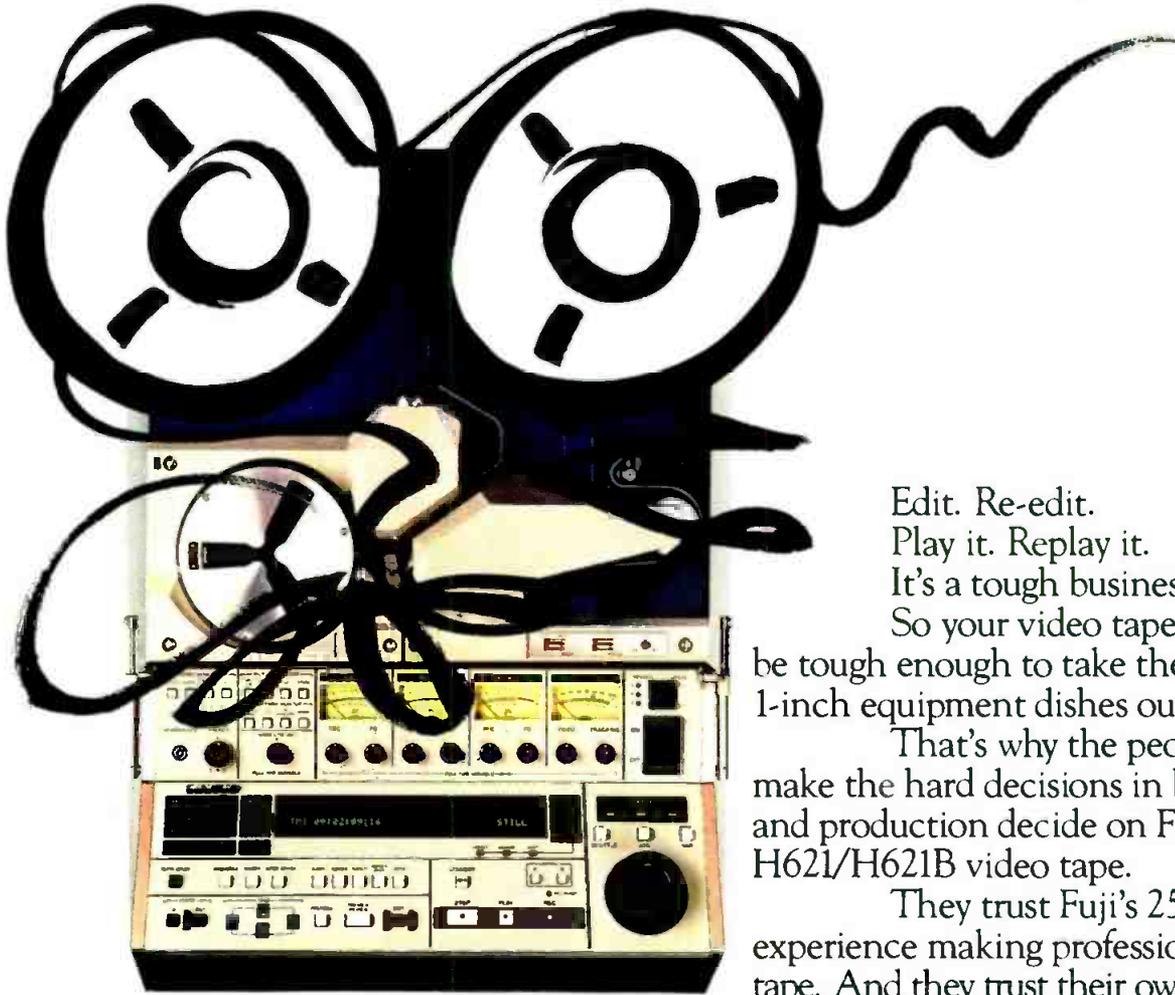
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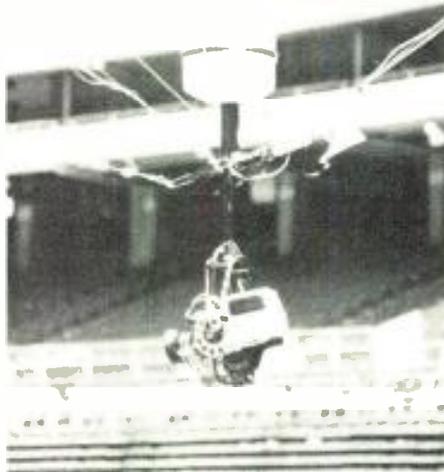
says Clare, "and applications, particularly in sports, will be more limited than we anticipated." Clare says it would be rare for TV producers to want the higher production quality and dramatic camera angles of a Superbowl, for instance, every day of the week.

Waving the white flag

Two manufacturers have all but given up on arousing sufficient interest for remote camera systems in the U.S. broadcast market.

British-based Evershed Power Optics was the first company to design a remote camera system for broadcast use when it began manufacturing pan/tilt heads for the BBC some 20 years ago. Since that time, EPO systems have found a home mostly in government applications, for carrying the proceedings of the Great Britain and Canadian Parliaments and, to a lesser extent, the U.S. Congress.

Edwin Sutter, president of Sutter and Co., EPO's last remaining marketing arm here, says the company has failed to find widespread acceptance of its products in the broadcast community, primarily because of labor unions. "Whenever a union man sees one of



Suspended from four steel cables attached to pulley, Skyworks' Skycam "flies" over a baseball stadium with camera mounted to a gyro-stabilized base.

these systems, he immediately wants to know when he's being fired," Sutter maintains.

Because of the apparent lack of interest, Sutter says EPO is not placing a great deal of marketing muscle behind its system in the U.S., although EPO

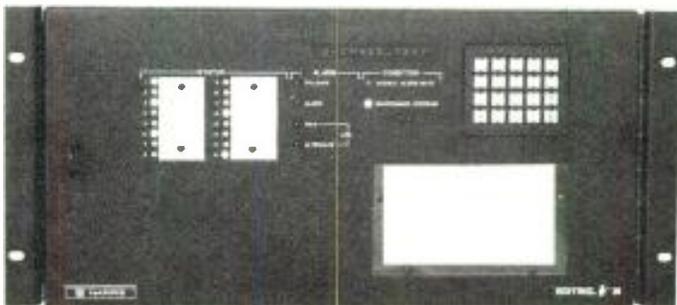
remote systems are sold in other parts of the world.

Sutter does, however, concede a limited market for EPO systems in non-union facilities, such as small-market TV stations or other government applications. Recently the company introduced an updated microprocessor-controlled remote-control product called System 90. It's a control unit which can be used with EPO's pan and tilt heads, from the heavy-duty head designed for studio cameras to those lightweight heads designed for ENG. The camera lens control is capable of 14 functions and the processor's memory can store up to 500 shots and control shot-to-shot changes, including fades.

Sutter says the system costs between \$15,000 and \$50,000. But he adds that EPO is not taking any special steps to woo American broadcasters. The company does not plan to be at the NAB this year, as it was last year. Sutter says EPO usually spends alternate years at the NAB.

Canon, too, has decided not to try to interest the broadcast community in a remote system right now. The company did manufacture and market a pan/tilt head system up until three years ago.

With Sentinel 16 Remote Control, There's No Cause For Alarms!



As an intelligent remote control system, the Sentinel 16 can be programmed to react to changes in the operating environment. It will attempt to solve problems before they require operator intervention. When critical parameters go outside your pre-determined limits, Sentinel 16 doesn't just sound an alarm. It automatically makes the required adjustments! What's more, the Sentinel 16 packs more features in nine inches of rack space than its competitors.

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The M267 oscillator provides a clean 1 kHz tone, and is located on the front of the unit for simple access. The headphone output is also on the front and includes a level control.

And IC design, along with active gain controls, provides greater headroom and quieter operation.

For location work or even studio post-production, the M267 carries on Shure's reputation for reliability and ruggedness.

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but like EPO, received a poor response. Although Canon has dropped its marketing plans here, however, it will demonstrate the system to interested broadcasters.

The product consists of a zoom/focus servo which attaches to standard camera lenses and an ac-powered remote-control box which can operate from 500 feet away. It sells for under \$1000.

As part of its recognition of the need for at least some limited remote functions in the broadcast world of today, Canon also markets a product which can take an ordinary ENG/EFP camera mounted on a tripod and give it remote lens function capability. The studio conversion kit has found a home among broadcasters, probably because it lets a camera operator zoom and focus without having to touch the camera at all. The device makes use of the camera's standard zoom servo to control both zoom and focus from the pan bar. The kit consists of a clamper with an eight-pin cable connection which attaches to the pan bar. A pistol or motorcycle handle-type grip twists to the left for focus, and to the right for zoom. A camera operator still has to be standing at the pan bar to operate the grip; thus, the

conversion kit is not a truly remote system. But it does allow for smoother lens control. Wolf says it's priced at under \$8000 and has gained widespread acceptance at many TV stations.

The flying camera

Probably the most unique remote camera system on the market today is a product which was not actually designed for remote capability in the strictest sense of the word. It's a motion system for lightweight cameras which was made to offer greater creativity and a wider range of shots in broadcast, film, and production uses.

Skycam, from Skyworks, was designed by the same man who won awards for the Steadicam system. Garrett Brown has invented in Skycam, a system which lets a camera "fly" through the air on a system of computer-controlled pulleys, allowing for "swooping away" or "follow around" shots (as in play-by-play) free from the obstructions and limitations of a "grounded" camera.

The camera is mounted to a base unit which is gyro-stabilized and has four (or sometimes three) steel cables attached to it. Each cable, connected to a



The W. Vinten Ltd. Microswift 200 microprocessor-controlled setup includes pan/tilt and zoom/focus remote control for studio and ENG cameras.

motor, is drawn through a pulley. The pulleys are mounted at four equidistant locations high over the area of activity, and the camera and base are suspended overhead. From as far away as 300 or 400 feet, a computer control unit with joystick controls is operated by a

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Now use color to highlight your complete transmitter and status information. Alarm conditions are shown in red and normal conditions are shown in green just the way you'd design a system for yourself! The Sentinel-48 is *EASY* to operate by pointing with our unique light pen rather than typing commands.

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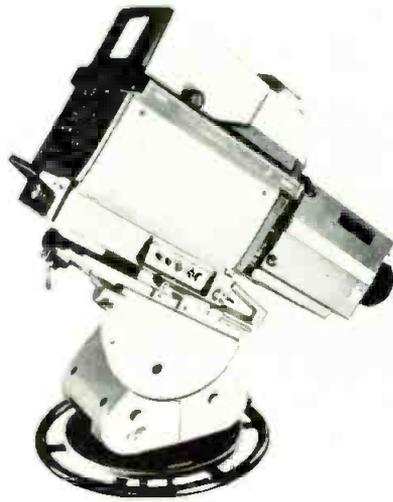
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trained "pilot." The movements are made through a series of coordinates which direct the camera's action. Data which determines the coordinates travels via telephone lines to each pulley motor, instructing it how much cable to take up or let out. Then, through a series of vector-like movements, Skycam flies over the scene below, panning, tilting, zooming, and focusing according to the pilot's instructions. The camera can reach lateral speeds of 23 mph. and vertical speeds of 27 mph. and Brown maintains that it is silent, accurate, and safe.

Skycam's video transmission travels from the camera to the recorder at the remote site via two microwave cones, or horns. One is on the base unit attached by cable to the camera, and it sends its transmission at 13 to 13.250 GHz, 250 mW to another on the ground, then by coax to the control console, TBC, and VTR.

The computerized control-by-coordinates allows Skycam to negotiate some difficult moves, and is also a safety factor. The coordinates of any obstructions, such as trees, poles or buildings or any "off-limits" points can be programmed into the controller



Remote system pioneers Evershed Power Optics have introduced the microprocessor controlled System 90 into its line but holds little hope for a U.S. market.

so that, should a pilot forget and accidentally try to move Skycam onto a collision course, the movement will not take place.

A sequence of stored moves can also be played in reverse. This allows a pilot to "cheat" a tricky shot by starting with the difficult end point, work towards the beginning, and play the whole shot in reverse. During replay,

any stored move can be altered in real-time, either through three dimensions or by speeding or slowing.

Because no one had ever seen anything like it, TV network interest in Skycam has run high from the moment it first appeared on the scene about a year ago.

NBC first tried Skycam out for baseball and football games, where it can follow a ball back into center field for a home run or track a quarterback as he heads for a touchdown. Unfortunately, some athletes found the hovering camera a bit unnerving, and this has kept Skycam off limits at many sports events.

However, Skycam was seen at both the Army-Navy and Orange Bowl football games, and at NCAA basketball games. It was supposed to have been used for some Olympics coverage, but a problem with the cables kept the camera system grounded. Since that time, Brown has replaced the original Kevlar with the steel cables the system now contains.

Sports events aren't the only places where Skycam has been useful. Music videos are an obvious natural for the system. It has been used recently in vid-

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With special features designed for the demands of live broadcasting, the new ADO 2000 system is fast and easy to operate. You have instant, single-stroke access to 30 effects stored online, with all the standard ADO effects available. You can add options such as rotation, true three-dimensional perspective and the Digi-matte™ key

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omies built into the system. You can use it stand-alone or with your switcher. If your switcher is an Ampex AVC, there are even more operational possibilities with a new ADO-AVC interface that gives you greater creative control.

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eos by Billy Squire, Cyndi Lauper, and a video-like Pepsi commercial with Lionel Richie which debuted during the Grammy Awards.

"It's an uphill battle," admits Skyworks' Jim Shaw, "but we're starting to get acceptance. As with any new piece of equipment, it takes time."

It also takes money. Because of the equipment and the need for trained personnel to operate Skycam, Shaw says it costs about \$30,000 a shoot. But that is not a figure likely to scare off network producers when sports coverage competition runs high, although it will keep small market broadcasters and smaller producers on the ground for now.

Shaw says Skycam will be at Panasonic's booth at the NAB, mounted to a Panasonic ENG/EFP camera. While in Las Vegas, Skycam will also be put to work taking some aerial views of the Hagler-Hearns boxing match.

"Up periscope!"

One other use of remote systems comes from Matthews in the form of a "snorkel" camera device. It operates much the way a periscope does, allowing a camera to probe into a miniature replica of a scene and send back



Cinema Products Mini-Mote remote system, manufactured by Matthews and shown here in a ceiling mount, is aimed at the ENG market.

images as if they were life-size. It can also duplicate a "barrel roll" movement as if it were a stunt plane, according to Matthews' Philips. The snorkel cam system is brand-new from Matthews, but it has been used in the making of commercials and could probably find a home in science fiction dramas.

Stiff competition and the mobility of smaller cameras seem to be the driving

forces behind the willingness of broadcasters to finally take remote camera systems seriously.

"The big battle in sports today is who gets the most creative shots" TSM's Gonnelli points out. "If you can put a pan/tilt at the most dangerous curve of a bobsled run, or on the backboard at a basketball game, you can get beautiful shots."

"People are oversaturated with sports on TV," Matthews' Philips agrees. "What's needed is a more dramatic and aesthetic way to bring it to the audience." Philips also believes that the fresh angles offered by remote uses bring the viewer "right into the action" and may make up for the limited depth-of-field of video cameras.

In spite of the fact that remote camera systems for video have stubbornly refused to take off in this country to date, the new systems appearing this year have a few advantages over their predecessors. Streamlined style, pared-down costs, multicamera function, computerized control, and improved servo systems may be the shopping list of "goodies" which will finally turn engineers' heads at this year's NAB. **BM/E**

Whose new AGC makes your Optimod sound even better?



Only the new Harris Ulti-Mate 91 Tri Band AGC! Here's more subtle signal control than you'll get from anything else on the market.

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You'll hear the difference immediately. Put Ulti-Mate in front of your Optimod or other audio processing system for remarkable sound enhancement. With its unprecedented 110 dB dynamic range, not even digital source material is degraded.

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Ulti-Mate's phase coherent design insures waveform fidelity and minimizes distortion as signals are processed and amplified. The linear VCA allows extraordinary processing capability to en-

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When you're ready for stereo—whether it's AM, FM or TV—so is Ulti-Mate 91. It's totally compatible with all broadcast stereo systems. And it can drive your STL, too.

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The Harris Ulti-Mate 91 Tri Band AGC slips neatly into 1 1/4" of vertical rack space (3 1/2" for stereo version). Adjustments are deftly concealed but easily accessed through a slide-out drawer. And if unauthorized adjustments are a concern, secure tamper proofing is easily achieved.

First-rate equipment for first-place ratings

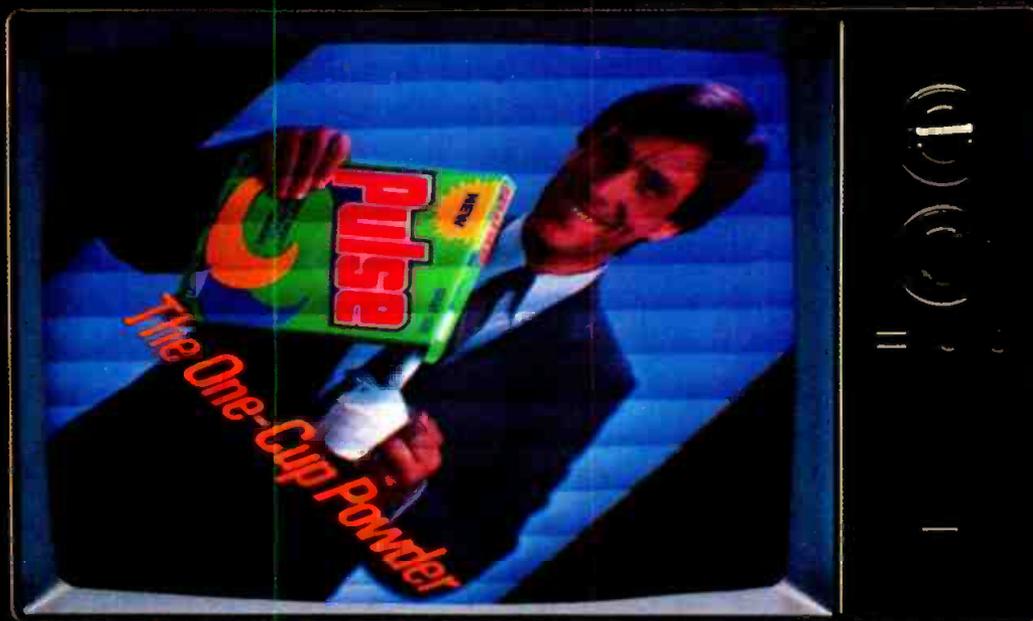
Good sound is the currency of Radio; it buys audience. Ulti-Mate gives you better dynamic equalization through the phase coherent Tri Band AGC, for markedly improved signal transmission. At a surprisingly low cost.

The Harris Ulti-Mate 91 Tri Band AGC. Audio processing has never been this good. For more information, contact Harris Corporation, Studio Division, P. O. Box 4290, Quincy, Illinois 62305. 217/222-8200.



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What you see above is yet another installment of TV's longest-running horror series: "The Lost Commercial."

The villain is the antiquated 2-inch cart machine—notorious for making valuable commercial air time vanish into thin air. And its appetite for destruction seems endless. Statistics show it's not unusual for a station to squander upwards of \$15 million yearly on makegoods alone.

But the nightmare is ending. Because Sony announces the first real advance in cart machine technology in over a decade. The new Betacart™ multicassette system.

THE CART MACHINE VS. THE SMART MACHINE.

What the old cart machine tried to do by mechanical means, the Sony Betacart achieves through superior intelligence.

Microprocessors keep constant track of 40 cassettes. They maintain the alignment of the system's four BVW-11 decks and its elevator. They run self-check diagnostic routines.

And, in the belief that an ounce of prevention is worth many times its weight in makegoods, they solve problems before they occur—such as warning a technician that he's about to remove a cassette that's due to air shortly.

The Betacart is communicative in other ways, too. It's smart enough to guide your technicians through its operation, and will even interface directly with your station's main computer.

MAINTAINING MACHINERY VS. MAINTAINING PROFITS.

The end result of all this electronic

THE MACHINE INSPIRED BY BILLIONS OF DOLLARS WORTH OF COMMERCIAL FAILURES.

sophistication is the kind of mechanical simplicity that virtually eliminates breakdowns—not to mention the makegoods, excessive downtime and high maintenance costs that are generally part of the package.

And, as its name implies, the Sony Betacart uses Betacam cassettes—which cost less than a third of what 2-inch cartridges cost. Its format also makes the system ideal for ENG use during newscasts—thanks to its compatibility with the Betacam™ camera/recorder, along with its multiple video and audio outputs and freeze/instant-start capabilities.

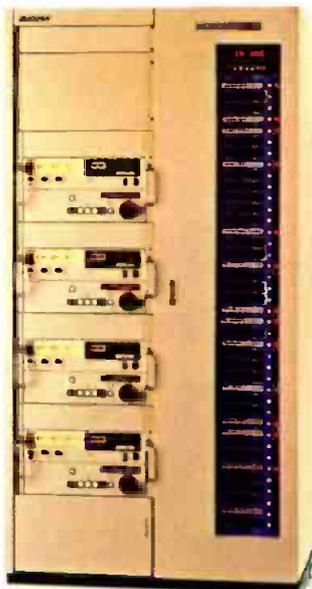
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Betacart multicassette an investment that will pay for itself quickly. And it will keep paying off in new ways. Its stereo capability, for example, will allow you to capitalize on the coming introduction of stereo TV broadcasting.

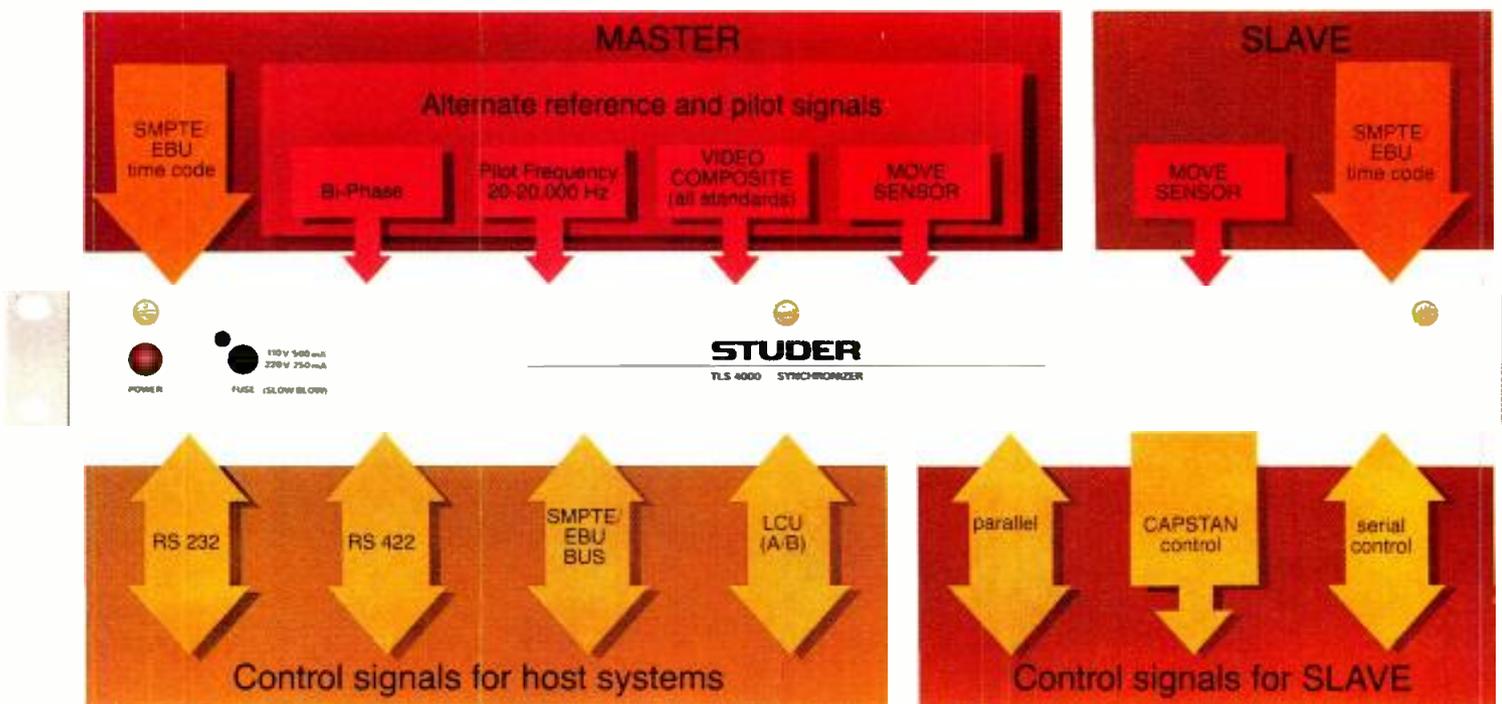
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After all, to err may be human. But there's nothing divine about having to forgive a machine.

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Local Control Unit (LCU). A separate Local Control Unit for

the TLS 4000 is available in two different versions: the basic version (type B) for many common applications, and the extended version (type A) which offers enhanced display capabilities as well as WAIT LOCK, SLEW MODE, LOOP, and CUE + GO-TO operating features. The compact Local Control Units fit in standard 19" racks as well as in the extended console overbridge on Studer A810 recorders.

Suit Yourself. Modular design lets you tailor a TLS 4000 system to fit your particular needs—present and future. For more information on Studer synchronizing systems, please write or call: Studer Revox America, 1425 Elm Hill Pike, Nashville, TN 37210; (615) 254-5651.

STUDER REVOX



Top to bottom: Type B LCU, Type A LCU, "black box."

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New Technology For News: Newsroom Computers

Part II

Last month we inaugurated a series of discussions about "New Technology for News" with a *BM/E*-organized roundtable held at the San Antonio RTNDA to analyze trends in newsroom computers. Here is the conclusion.

Seated around the table during the three-hour, no-holds-barred meeting were some of the world's leading news computer users:

- Mel Martin, VP news, WJXT-TV, Jacksonville, FL.
- Rob Barnes, director of the corporate information system at Turner Broadcasting in Atlanta.
- Sheldon Hoffman, managing director of news production systems, NBC News.
- John Griffin, director of computer operations, NBC News.
- Jerry Rosholt, an editor with NBC News.
- John Williams, assistant editor for news and current affairs, BBC Radio News, London.
- Spencer Kinard, news director, KSL, Salt Lake City, UT.
- Rob Sunde, news director, ABC Information Radio Network.
- Paul McKee, ITN, London.
- Ian Morrison, Atlantic Television System and Atlantic Satellite Network.
- Larry Cooper, news director and executive producer, CBS Radio.
- Jim Topping, news director, KTRK-TV, Houston.



Panelists at BM/E-organized roundtable on new technology for news: newsroom computers.



- Mike Ferring, news director, KRON-TV, San Francisco.
- Bernard Gershon, WOR Radio, New York City.
- Robert Rivlin, editor, *BM/E*.



Rob Barnes, Turner Broadcasting

RIVLIN: We've heard a lot about the benefits of newsroom systems. But surely there must also be some problems, some pitfalls. What are your experiences?

KINARD: For all their values, newsroom systems are a mixed blessing which force you to trade rather simple means that are easy to maintain for high technologies that are expensive to maintain. This is especially true for high-speed printers that do not work—which are high-maintenance items, versus a typewriter that you have to clean and wipe the platen off once in a while.

COOPER: When we first started our system in New York, we had four Manesman Tally Printers. It quickly became evident to us that they were not adequate. However, the computer company said they've been adequate before for every other installation they'd done. Well, they weren't ade-

Larry Cooper, CBS News



BARNES: "You want to avoid at all cost having the end-all, beat-all system, which gives you a race car that looks like a tractor-trailer. It can pull big loads and carry lots of information, and it also can be a race car, but it never does anything well."

quate for us at all. The belt that drives the printer would stretch, and they would say it was because it was too warm in the newsroom.

KINARD: Ridiculous! That's the answer for all computer problems—"it's too warm."

COOPER: Printers are the sore spot about these computer systems—when you go to get something out and you push the button and the paper jams or the thing doesn't print right.

What I'm saying is that when you go to explore these systems, you should try somehow, somewhere, to get all the facts you can at your fingertips on what they're actually offering in the way of hardware, to make sure that you're getting the most for your money.

BARNES: There is a real problem with computer salesmen. We have a standing joke in our office about personal computer stores: How do you tell if a computer salesman is lying? Watch his lips. If they're moving he's lying. Because his whole mission in life is to part your money from your wallet. And he's going to low-ball the price as much as possible so that management will say "yes." Then they've got you. "Oh, you wanted to do that, too? We've got this other stuff . . ."

RIVLIN: Is this a common problem? Finding ways to expand the system and adding new features without completely redesigning what you already have?

HOFFMAN: Every newsroom operates differently. In theory, we all should be operating the same way. But the work patterns that have evolved into the present operation are different for each place, and they all have their different quirks as to how they'd like to get their program on the air. So there is no

off-the-shelf system that satisfies everybody.

In every organization the operating parameters are different, and it should be possible to configure the system for each user's needs. Unfortunately, the computer system manufacturers guard their computer code like national security was at stake, and I think when you become a user of a certain size you really can't wait for the manufacturer to come up with the changes, because while we at NBC may claim that every change we want has a priority one, it may be priority infinity in terms of a company's overall need to satisfy the majority of their users. For instance, if we wanted a screen to come up upside down, that would certainly get low priority in terms of the universe of users the company services.

COOPER: You want more things out of the system every time you turn around. We should be able to configure it to our particular needs—not just customize what's already there to make it easier for someone to get to.

GRIFFIN: When you're buying a system, one of the first questions you want to ask is, what if we want a change? There are some systems that are like a rock—you can't change a keyboard, you can't change anything.

BARNES: On the other hand, you can take personal customizing and system reconfiguration too far. Imagine the state of chaos that would exist in the stereo industry if you went to buy a stereo and the salesman said, "Okay. What would you like?" Instead of, "Here's this brand and this brand. Which do you prefer?" All of the brands have some things in common—treble and bass controls, tuning dials, etc. So we can add frills to our compu-

COOPER: "When you go to explore these systems, you should try somehow, somewhere to get all the facts you can at your fingertips on what they're actually offering in the way of hardware, to make sure that you're getting the most for your money."

HOW DO YOU JUDGE A COMPUTER NEWS SYSTEM?

NEW
BY THE COMPANIES IT KEEPS.

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VN2-TV • BUSINESS TIMES • KRLD-TV
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Jim Topping, KTRK-TV, Houston

ter systems to make them a little better. But we can forget that they are basically computer systems which are set up to do a certain job.

MARTIN: I think the answer is to write user-definable software as much as possible. You may not be able to define everything, but those of us who have seen the simplest \$50 database manager for a personal computer which allows us to generate ports and columns, and add them any way you want, and convert to metric if you want, are trying to get the same flexibility with the newsroom systems. It will probably evolve into a situation where you have modules of programs hung on your main system.

BARNES: You want to avoid at all cost having the end-all, beat-all system, which gives you a race car that looks like a tractor-trailer. It can pull big loads and carry lots of information, and it also can be a race car, but it never does anything well.

RIVLIN: How is it working out when dealing with your engineers on these newsroom systems? Are you finding cooperation, or is there some resistance?

TOPPING: Most of the engineers that I have worked with have been oriented toward large fixed base operations. If you want to buy a transmitter or you want to buy a new television station, they're terrific. But if you'd like to know what works in the field or in a news setting, it's very difficult. News has had to develop an engineering expertise of our own—smart, bright young people who have been out there in the mud and rain.

I don't mean to imply that I'm not well supported by engineering. They're just skilled in a different kind of inter-

TOPPING: *"It has only been in the last few years that news directors have become capital intensive and been involved in large acquisition purchases. Before that, it was always an engineering function."*

est. They don't do the work I do, and they don't use the equipment the same way. The field ENG technician is an entirely different person than the studio engineer. One talks about coffee breaks and fixed times and how long he gets before he gets to sit down, and the other wants to do everything he can to make the scene work.

ROSHOLT: I can't imagine anybody in engineering knowing anything about what's the best battery-operated portable computer.

KINARD: I find engineering to be primarily a support system for what we currently have. But in terms of keeping track of the future and where we're going as a news organization, I don't think they have the interest, and therefore they're not generating the information that is useful to me.

I found the best thing was to hire somebody who knows computers far better than I do to manage the system for me—our operations manager. He's the guy that used to buy batteries and cameras, and still does. But I found out he also knows computers very well. Larger operations are going to need very computer-literate people to manage the systems for them—not necessarily engineers.

BARNES: I feel lucky to be surrounded by what I consider enlightened engineers. They come to me and ask what the computer can do for them, and we are providing systems, for instance, to let them catalog their wiring runs, and identify cable lengths and where they are supposed to be connected. We also provide a system for locating all the equipment—when we had to ship a huge load of equipment overseas, the computer told us that most of our batteries were in the New York bureau.

KINARD: *"In terms of keeping track of the future, engineering is not generating the information that is useful to me. I found the best thing was to hire somebody who knows computers far better than I do to manage the system for me—our operations manager. He's the guy that used to buy batteries and cameras."*

HOFFMAN: Engineering will get folded into the computer system, if not operating it directly. During the political conventions we used the Basys units to manage our broadcast operations. We listed the complete facility schedule for the next day, so that the engineering people could look at the terminal and see where their assignments were, what time they were scheduled for, and what the assignment was. Also, during the election, we had roughly 45 to 50 remotes listed on the computer, with all the phone numbers of everyone working at each location. Anybody, anywhere with a terminal could access the latest information.

TOPPING: It has only been in the last few years that news directors have become capital intensive and been involved in large acquisition purchases. Before that, it was always an engineering function.

RIVLIN: This brings up the question about who is running the operation these days. If engineering isn't involved, who is making the decisions to buy equipment?

HOFFMAN: I think the larger the organization the more unlikely it is that the "chief engineer" will make the ultimate decision. As an organization becomes larger, it becomes more decentralized, and the decisions are made in each operational area. The chief engineer may have to sign off on it, but that may just be a rubber stamp. Of course, when you get down to the smaller station, the chief engineer really becomes the chief engineer for everything—from the transmitter to the pencil sharpeners.

COOPER: I think if you'd have to guess who's running the newsroom computer without knowing about the

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Mike Ferring, KRON-TV,
San Francisco

specific operation, you'd pick the news director.

BARNES: In some stations, the chief engineer is still making the decision on buying the computer. But that's like talking to a mechanic about which car to buy. The engine runs or it doesn't run and it has four or eight cylinders. But that doesn't really tell you about the car. The newsroom computer system is not its bits and bytes and how big a disk it has. Functionality—that's the issue. And it's not an engineering question but a human question.

We found that as computers creep in through the back door or are brought in through the front loading dock, we have had to add staff to support them—a full-time, around-the-clock staff who are there to help when someone says, "I forgot how to print out, what button do I push?" or, "The printer's out of paper, it's not my job to change it." They're part of the corporate information staff, not computer technicians worrying about bits and bytes.

RIVLIN: Is this a common experience now? Are you finding that you need to change your way of dealing with how computers are set up and installed? Are you looking for a different group of people to help manage them?

FERRING: I think even the smallest newsroom is probably going to have somebody in it who's something of a computer freak and will respond to the computer and learn it and become the person you can rely on. In our case it's Dick Van Lee, a producer, who is also head of the Basys users group.

KINARD: We have not hired or created a new position, but jobs have been modified. It may be a producer, it may be a writer, it may be an engineer, it may be an operations man that will do it. But definitely there are job descrip-

FERRING: "I think even the smallest newsroom is probably going to have a somebody in it who's something of a computer freak and will respond to the computer and learn it and become the person you can rely on."

tions that are evolving that will require computer management experience.

RIVLIN: As we go around the table, I'd like each of you to identify the one area in newsroom computers that still needs further development.

TOPPING: I would like to see more compatibility among systems—more pooled information between hardware and software manufacturers so that you don't get a piece of equipment that works fine for one particular function, but can't be blended with the rest of your system.

KINARD: My one wish would be to have a newsroom full of people who totally understand the system, and know how to do everything it is capable of, so that we can then move on to other things. We're sitting around here today talking about things that we would like computers to do, but we're still a long way from understanding what they can do already.

MARTIN: I'd like to see the user interface made more simple. And along the lines of what Spencer Kinard was saying, I think there are a lot of things our computer can do that people simply don't realize. So it needs to be simpler.

I would also like to see a "cafeteria" approach to software, where each end-user could say to any vendor, "I need this, this, and this function," put it in, and go.

ROSHOLT: We need better portable computers for the field, so that our correspondents in Central America, Africa, and so forth can work out of a briefcase and get the stories back to us in New York City. Perhaps we can even have a battery-operated system that will send the story up to a satellite.

GERSHON: I would like to see us be able to go out and buy software from other companies that would allow the newsroom computer to do budgets and

other things that are involved in running a radio station. I think that would make computers more saleable to a station as a whole, especially the small stations. And, of course, we'd like a computer that can make coffee.

SUNDE: I think the diversity of systems is going to be terribly confusing for a long time, but eventually it will become very simple, and I think everything will mesh together in our lifetime. The most important thing to remember is the human element, and the reason we have these wonders in the first place is to free up the mind to think of things other than technical ways for getting the news product out, to have some time to contemplate the ideas we're dealing with.

McKEE: We must make sure that were using most effectively the capability that's already there. In my experiences with a variety of systems over a long period of time, it inevitably takes something like five or six years to really use most effectively the capacity you've got. It's very easy to think of new things and changes and things it would be nice to have without making the best use of what we've got already today.

BARNES: Our first need is for fault-tolerant systems, so that if a board should go bad or a disk drive fail, a system doesn't stop in the middle of the newscast. You should be able to solve the problem, and pull the board out while the system is running on its internal backup—a dual everything. It should be like a hospital where you have emergency generators that keep the lights on and keep the heart machine running.

The second thing we need is intuitive interfacing. Instead of having people learn a very complicated set of commands to deal with the system, I think it

GRIFFIN: "When you're buying a system, one of the first questions you want to ask is, what if we want a change? There are some systems that are like a rock—you can't change a keyboard, you can't change anything."



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Sheldon Hoffman, NBC News

ought to be like the telephone. There are manuals available; but we all grew up watching somebody else use the telephone, and when we were little kids and the phone rang, we simply picked it up and said "hello."

The last thing I'd like to see is the journalism schools in this country start prepping the people that are coming knocking on our doors by exposing them to the technology before they get to us.

HOFFMAN: "I'd like to see absolutely fail-safe operation. Short of a direct hit, the system should run 24 hours a day, seven days a week, in spite of anything."

GRIFFIN: I'd like the ability to interface between different systems, being able to access other databases with the newsroom database.

HOFFMAN: I'd like a system that's infinitely expandable, so that if you wanted to go from 100 to 300 to 500 terminals, you wouldn't have to start over and demolish the original system. In other words, modularity of system architecture.

I'd also like to see absolutely fail-safe operation. Short of a direct hit, the system should run 24 hours a day, seven days a week, in spite of anything—whether that requires three parallel systems any one of which will keep you going, or whatever the architecture has to be.

Also we need the ability to reach the system from anywhere in the world without having the correspondent have to carry a device for which he has to

wear a truss—as small as possible, as easy to operate as possible, and as light as possible.

COOPER: Simplicity—that's the basic thing. Make it more simple, and then go to our management schools and have them teach us a course in how to integrate people with these computers a little bit better.

FERRING: The key item on our wish list is being able to work off-line and then transferring stories into the main computer once they're written. Another thing we're looking for in the immediate future is being able to enter character generator information from the terminal and eliminate a lot of the resetting and retyping and that sort of thing which is so time-consuming and opens itself to so many errors.

RIVLIN: What else are you looking for as systems grow and we start looking at perhaps another generation of

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Mel Martin, WJXT-TV

MARTIN: "I would like to see a 'cafeteria' approach to software, where each end-user could say to any vendor 'I need this, this, and this function,' put it in, and go."

newsroom systems even beyond what we have now?

HOFFMAN: Probably more standalone capability, so that if the mainframe goes down you're not out high and dry somewhere without communications. I think you'll find more PC-type of terminal operations.

MARTIN: Security, so that if someone comes in through a modem they can't read our rundown. Even if there

aren't hackers in our own newsrooms, there will be hackers in someone else's newsroom, and modems now make that a very important priority, because it means that your competition is well-equipped to come in and read your scripts.

BARNES: It's hard enough to get management to approve the purchase of a computer. Imagine how hard it would be to get a security device approved. You call up on the modem, it gives us the tone, you punch in your access code and you hang up the phone, and it checks to see if you're a legitimate user and it will call you back at the preassigned number.

MARTIN: We're evolving to where some files will be read-only and you will not be able to do any killing of material through a modem.

BARNES: Besides security, image

processing is the next big wave of development. If I'm supposed to follow a guy at the courthouse steps, I'd like to be able to call up the main office and get a picture on my screen that I could print out as easily as I can now handle text.

RIVLIN: Is anyone thinking about the possibility that at the same time a script is written it could be made to incorporate other pieces of information—such as instructions to a still store?

HOFFMAN: Lower thirds could be written in at the time the script is prepared, so that the character generator is driven by the news system. I know Quanta manufactures newsroom systems and also character generators, and maybe they're working on an integrated system where you enter the lower third information on the script. I suppose it could also start a VTR by putting the roll cue mark on the script.



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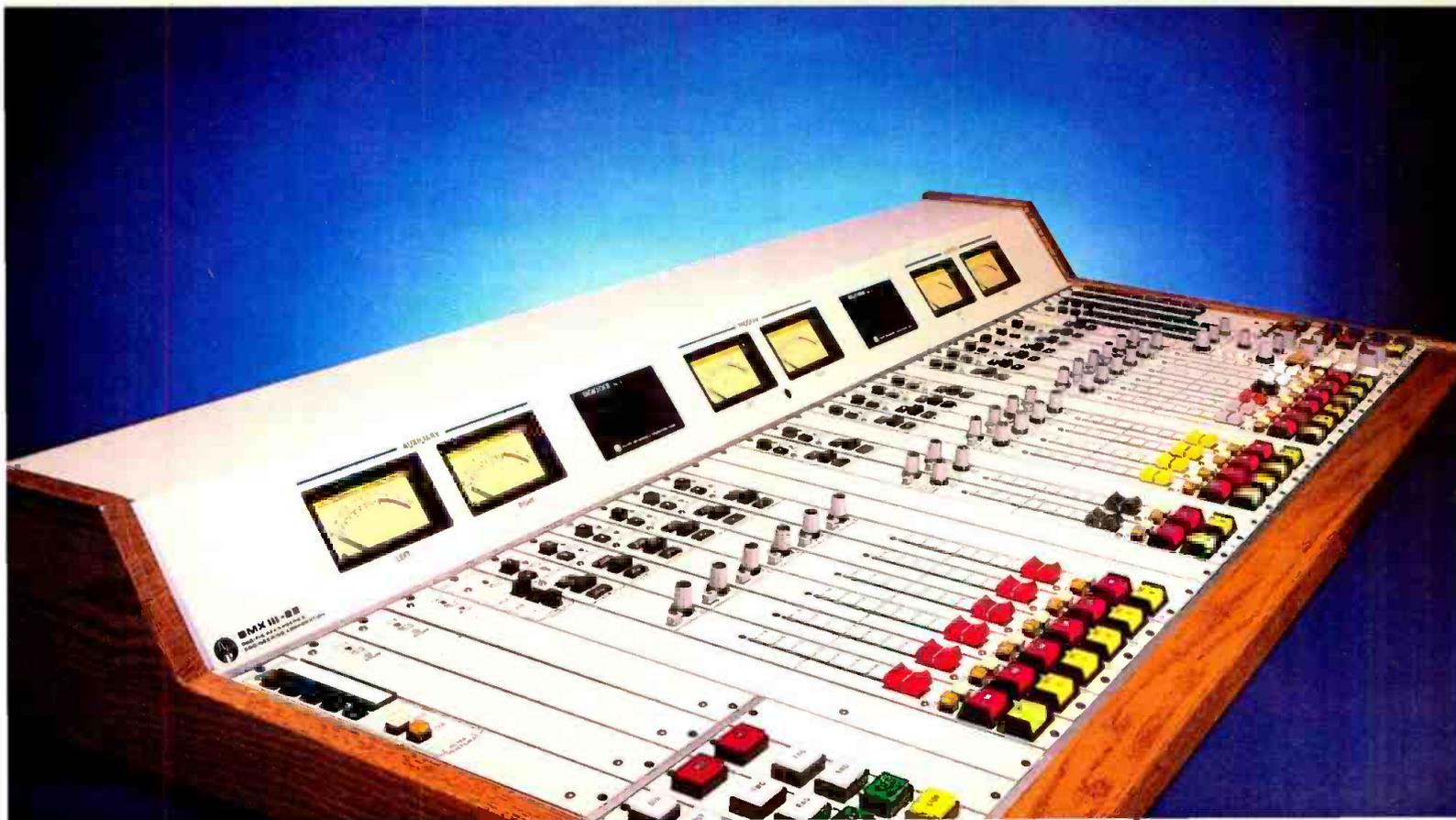
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Jerry Rosholt, NBC News

ROSHOLT: "I can't imagine anybody in engineering knowing anything about what's the best battery-operated portable computer."

TOPPING: There'll have to be some standardization of use of triggering mechanisms. The problem is that I may not want to buy an entire system from a single vendor, and may want this distributor's character generator and another's digital still store, and yet another's heading system. Right now, they're not talking to each other at all. In fact, they're avoiding talking to each other.

HOFFMAN: I think they're getting

to that now, so that whatever system you buy it can control other systems through a closure signal. The CMX editor, for instance, will talk to a Grass Valley 300 switcher, or the Ampex ADO digital effects unit, or start a tape machine of any manufacturer by just providing an initiating signal. I think all manufacturers realize that it's in everybody's best interest to standardize some code so that they can speak to each other.

KINARD: The Sony Betacart is a perfect example. If they want to market that system properly, they'll find a way to interface with newsroom systems, so that from their newsroom computer you could print out the cassette code labels and then run the on-air playback.

BARNES: Soon we'll probably see configuration programs like those you get with a word processor that give you a list of 20 printers and automatically set up your system so that you can com-

municate with your printer.

RIVLIN: Is news production, then, moving towards a more and more automated operation?

KINARD: The computer lends itself to that kind of concept. We could probably devise hardware today that would run everything in the newsroom so the anchorman would read off an electronic teleprompter, and the computer would run the VTRs and switch the program, and put the Chyron on the air, etc. But news is so variable that I don't think we will ever get to that totally automated stage.

BARNES: That's right. This isn't *The Dukes of Hazzard*. The Pope was shot 10 minutes ago, what are we going to do? You can't plan weeks ago what you're going to do right now. We've got to stay flexible, because it's how you handle the surprises, the "got-you's," that define how good you are at this game. **BM/E**

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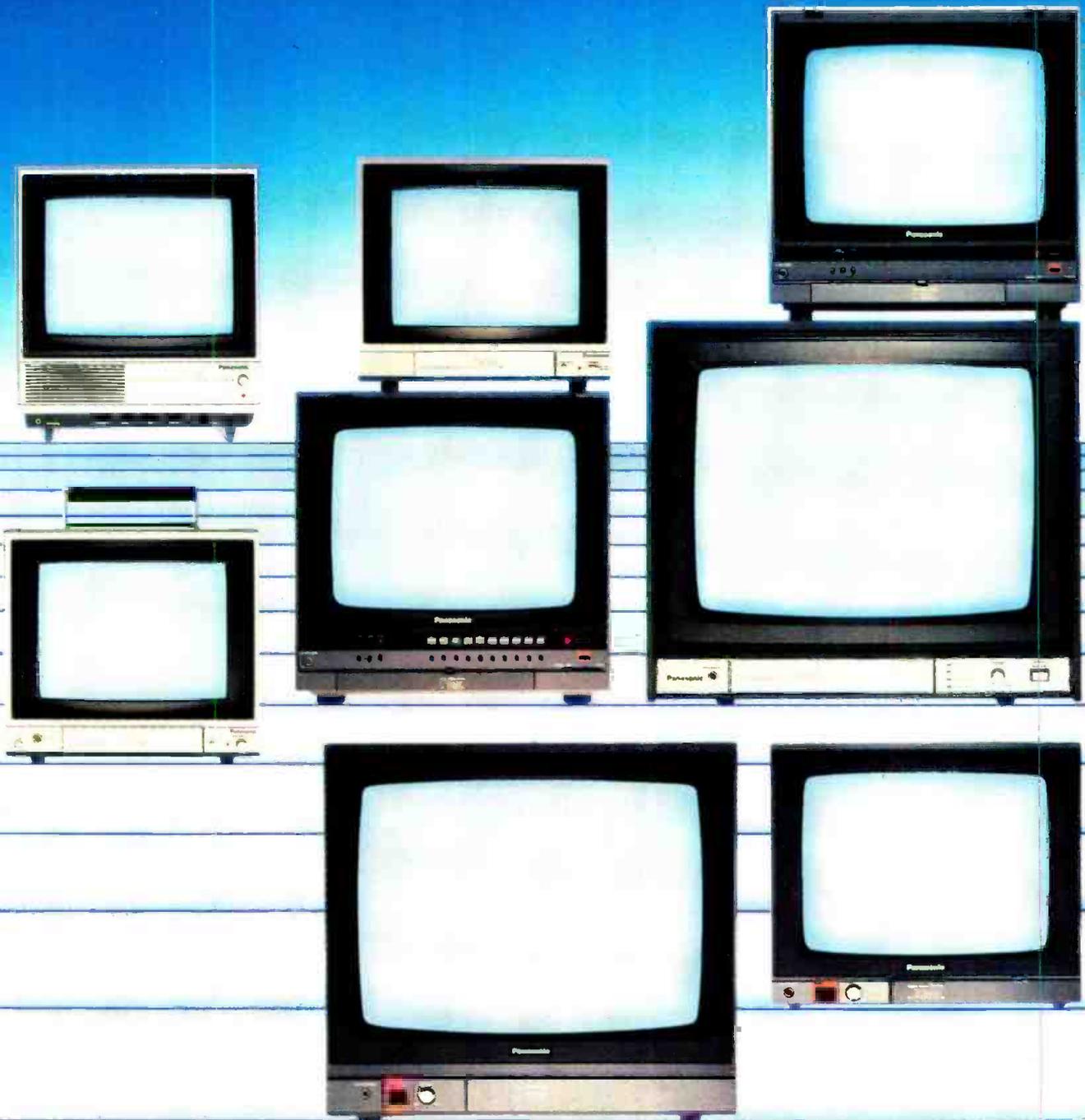
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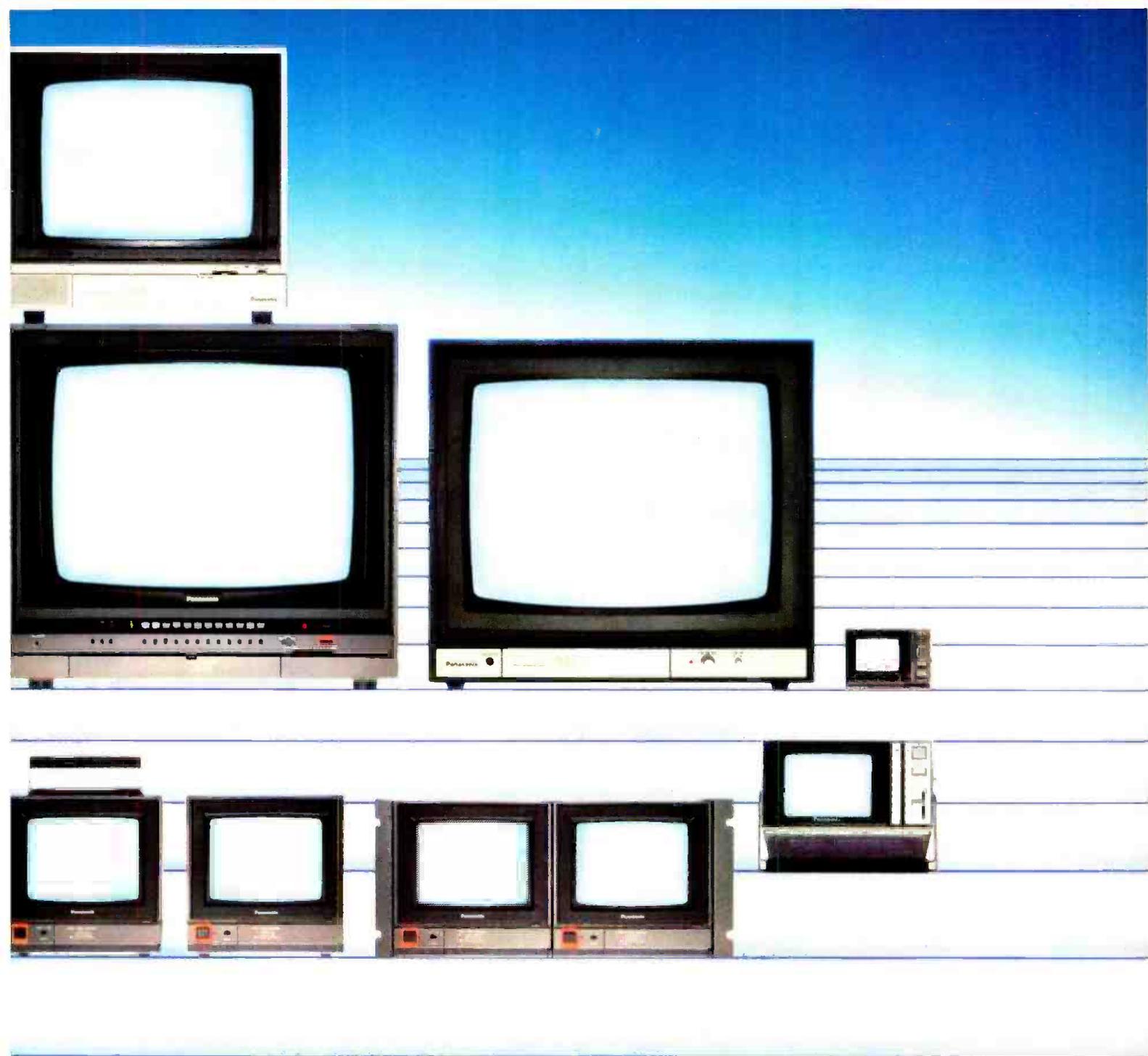
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THE DESIGN OF THE ALMOST

Computer circuit simulation, used to guide the design of a filter, will find increasing use for all advanced circuit research.

By Robin Lanier

The television stereo generator, centerpiece of stereo sound transmission in television, must perform at a new, high level of precision, far above that of television's historic handling of audio, if stereo sound is to be put on the air successfully. This precision injects unusual rigor into the design of the unit, creating a number of difficult design problems for the manufacturer.

These difficulties have refocused attention on the remarkable power of computer circuit simulation, a design technique that has high value in every sector of electronic

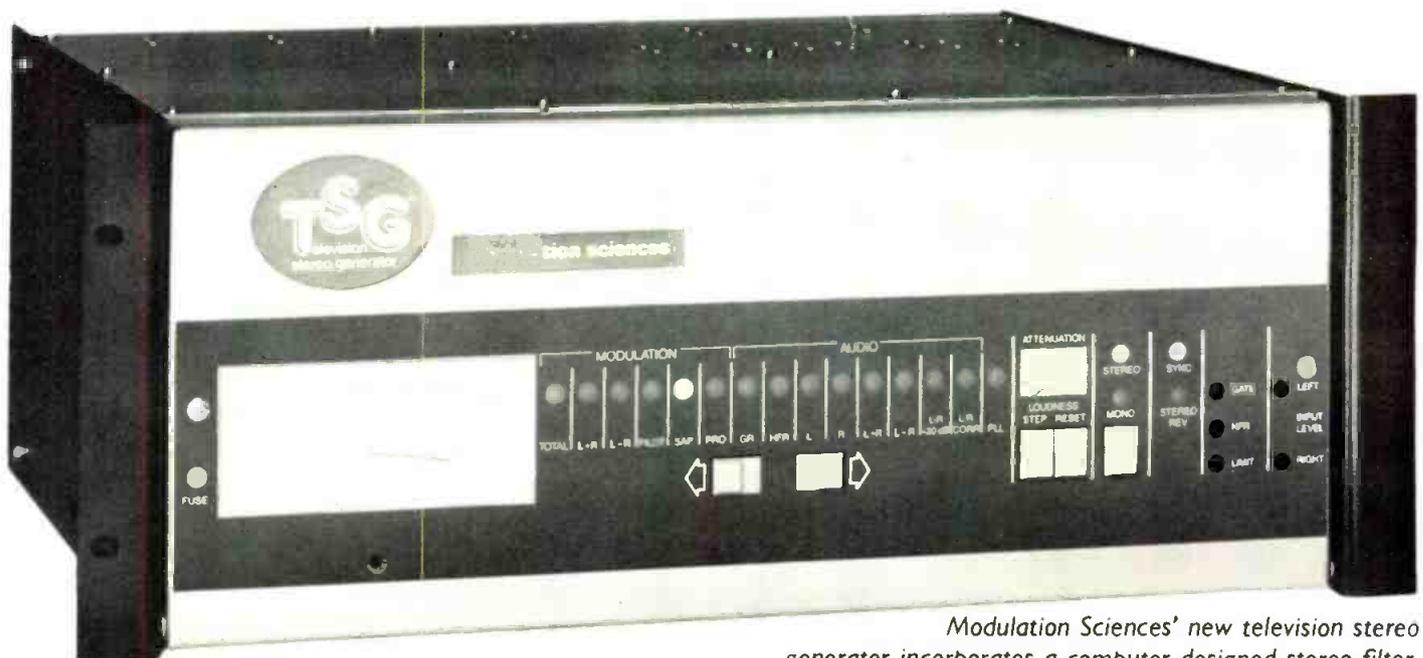
IMPOSSIBLE

design—in some cases making the nearly impossible possible. Every engineer concerned with advanced circuit design should be aware of the tremendous help he can get from circuit simulation.

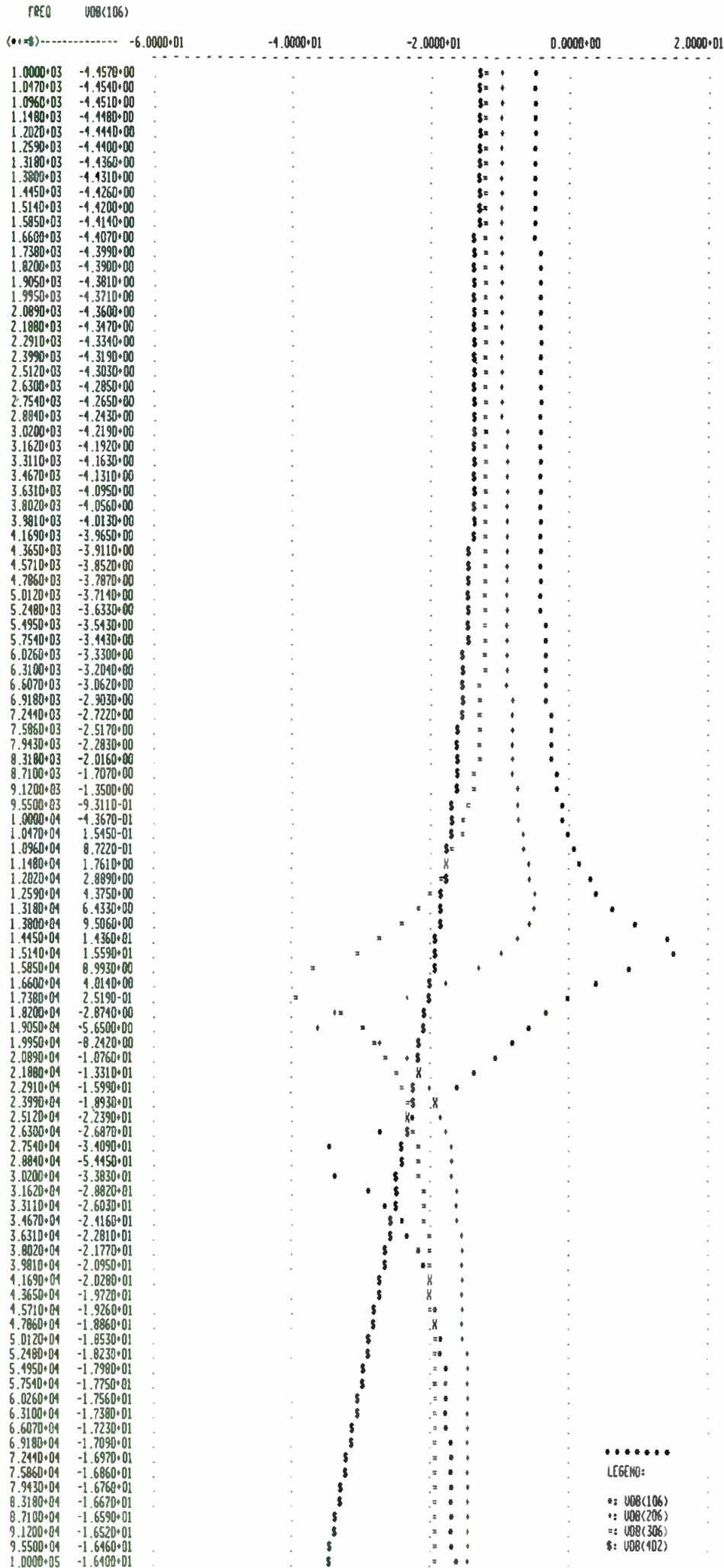
In the case of Modulation Sciences, the circuit was the TV stereo filter that keeps the sum signal, L + R, from interfering with the pilot signal at 15,734 Hz as well as the L - R double sideband suppressed carrier signal occupying the band from 16,468 Hz to 46,468 Hz. It must also keep the difference channel from interfering with the sum channel and pilot.

Without thorough knowledge of advanced filter design

FILTER



Modulation Sciences' new television stereo generator incorporates a computer-designed stereo filter.



fundamentals, plus the help of the circuit simulation, it is doubtful that this filter could have been successfully built at all. "Success" here includes not only performance at the high precision level required, but also a filter that can be built with available commercial components and practical production methods.

Difficult design

We can see why the design was difficult when we examine the job the filter has to do. The BTSC specification for the system is for flat L + R response to 15.000 Hz. With the pilot at 15.734 Hz, the filter must drop the response about 55 to 60 dB between 15.000 Hz and 15.734 Hz.

Without this reduction in the audio signal the pilot can be harmed in two ways. The phase of the pilot can be skewed, thus interfering with the decoding process in the receiver (for proper decoding, the pilot phase must match that of the difference signal subcarrier). The second bad effect is a degradation of the anti-aliasing action of the filter. If too much of the audio signal comes through above 15.734 Hz, the higher frequencies can produce modulation products that are, in the audible range, a source of distortion.

The filter handbooks show how to build a moderately complex filter that can drop the signal as much as 100 dB between 15.000 Hz and 15.734 Hz. But the control of phase response, and especially of ringing, is far from simple. It is an axiom of audio engineering that a sharp low-pass cutoff is extremely hard to create without heavy ringing below the cutoff. One major trouble with heavy ringing, of course, is the over-modulation it causes when the signal level is anywhere near the modulation limit. Another is the degradation of transient response.

To get the ringing down to an acceptable level, the designer can use circuit configurations that involve a tradeoff: the amount of signal that gets through into the stop-band of the filter will go up as the ringing goes down. With standard design methods, this throws the designer into a nearly endless round of calculations and tests in his attempt to find the optimum tradeoff point, with both effects acceptably low. And "acceptable," as already noted, now has a much more restrictive meaning with re-

Phase and amplitude performance of the Modulation Sciences filter as described by the SPICE program.



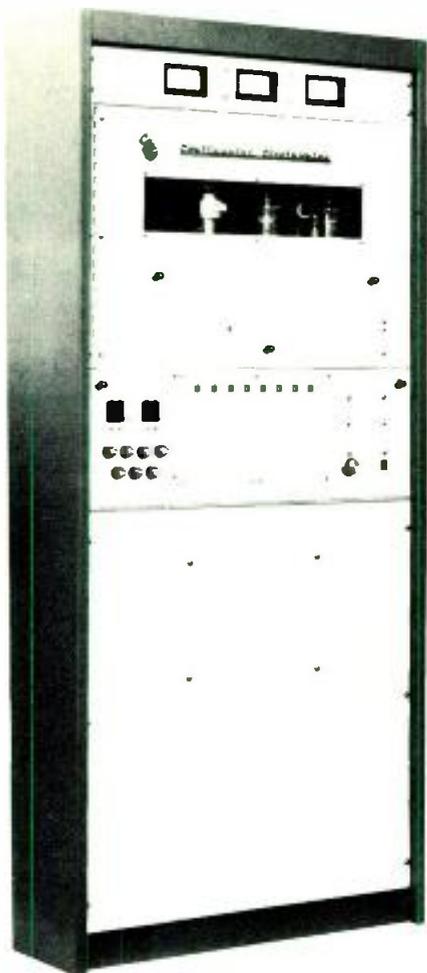
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spect to audio than it had in prestereo television.

Circuit simulation

Enter computer circuit simulation. With a proper simulation program in the computer, the designer can enter a complete description of a proposed circuit, along with the nature and value of each component. He does this by numbering each "node" in the circuit, that is, each point where one component is connected to another. Then he enters the node numbers along with the connected components; the computer automatically constructs the circuit. The components will include all active electronic devices.

Once the circuit is in the computer, the designer can direct the computer to run any set of appropriate signals through the circuit. The computer will show the output for each signal put in, in numbers and in automatic plots of response over the range of the input signals.

The whole process of running the circuit program, with any set of inputs, takes only minutes. If the performance is not up to the objectives in any respect, the designer can, in seconds, change the circuit, or the values of any components, and try again. Proving out a circuit this way, amending it step by step to reach the performance wanted, is clearly hundreds of times faster, as well as more flexible, more accurate, and cheaper, than doing the job with any kind of breadboarding and test gear.

It is obvious that a very special computer program is needed. Modulation Sciences used SPICE, developed at the Department of Electrical Engineering and Computer Sciences at the University of California in Berkeley. The smallest computer it runs on is a DEC VAX, which has a true 32-bit virtual memory. Perhaps one day there will be a version that will run on a Motorola 68000 computer, but it is not in existence at this time.

SPICE is designed for nonlinear dc, nonlinear transient, and linear ac analyses. The user can simulate circuits with resistors, capacitors, inductors, mutual inductance, independent voltage and current sources, four types of dependent sources, transmission lines, and the four most common semiconductors: bipolar transistors, diodes, JFETs, and MOSFETs. Models for the semiconductors are built in: the user need only specify the pertinent parameters, which can include a very extensive set, with

such entries as charge storage effects, current-dependent output conductance, and a score of others.

Another general virtue of the program should be noted: it allows the designer to quickly investigate the effects of using "real world" components rather than "ideal" ones. The ideal capacitor has only capacitance; the real one has inductance as well. Inductors have resistance and capacitance as well as inductance. The program can quickly show how serious the effects of these secondary parameters may be.

Commercial components

The same rationale applies to the expectable tolerances of commercial components. Selecting the testing components one by one for the unit is, of course, impossible in production. If the design takes into account the range of values to be expected for each component, performance will not be degraded by tolerances. This is especially important because of the precision needed. Ignoring the differences between real and ideal components, and ignoring the effects of normal tolerances, could well make the difference between failure and success in this design.

As a preliminary to designing the filter, Modulation Sciences ran through SPICE the filter developed by Zenith for the (winning) system in the BTSC tests. This filter was obviously not put forward by Zenith as a final, commercial design, but as a lab-built device used to help demonstrate the Zenith system. It is a fairly complex filter with both inductors and capacitors as frequency selective elements. It is passive: there are no active electronic devices.

In the SPICE runs the filter, while performing well enough to produce good results in the tests, caused ringing in the sum signal judged too strong to avoid overmodulation under many conditions of program transmission. In addition, the amount of signal coming through the filter, while not large enough to cause obtrusive distortion in the tests, did not meet the BTSC specification set up for the protection of the pilot.

Modulation Sciences' designers decided that their filter should be an active and a more complex one. They split it into sections for preliminary simulation checks. This had the obvious virtue of isolating difficulties to small sections of the filter, and also allowed sections to be put in a sequence that avoided successive peaks at nearly

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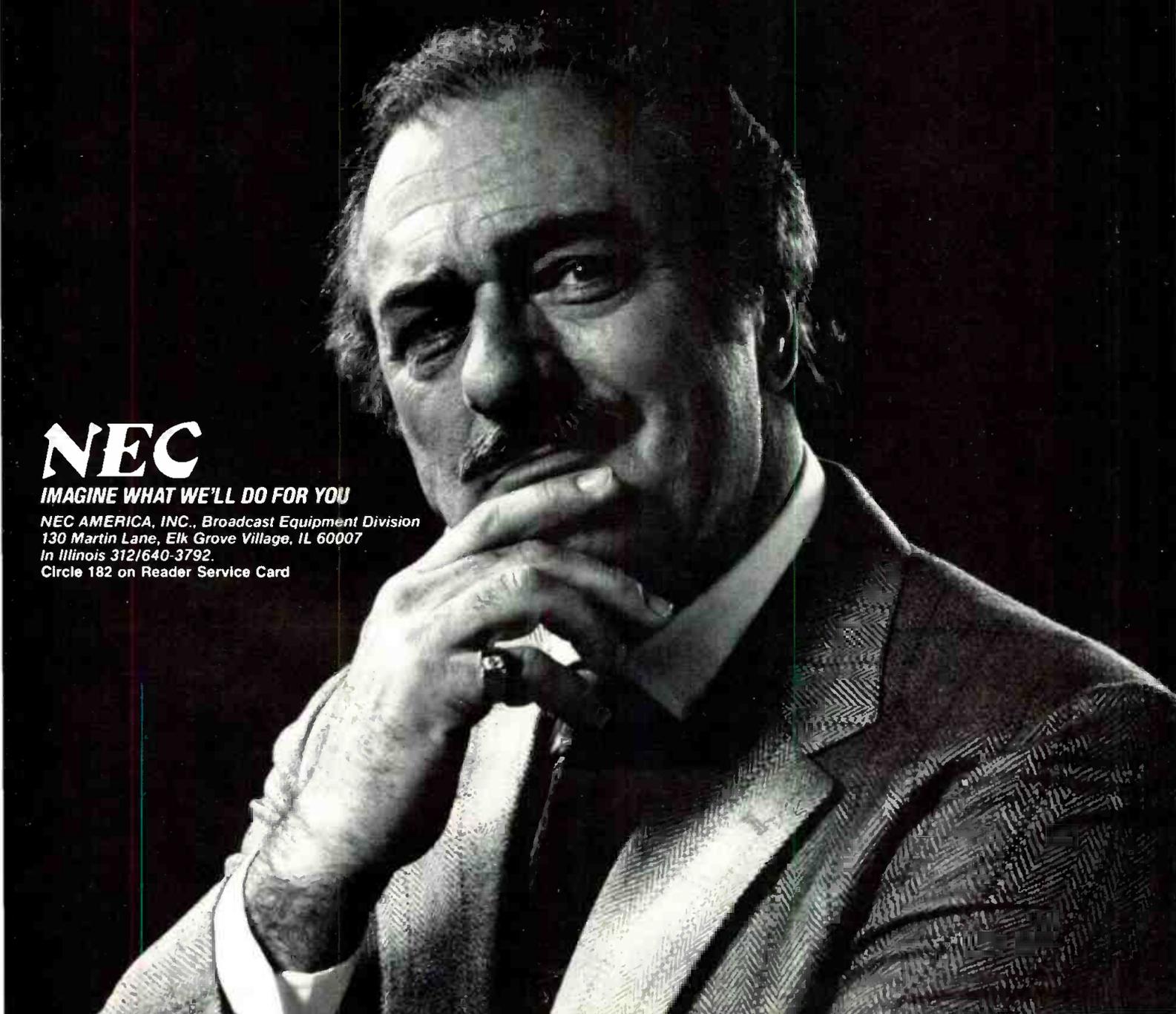
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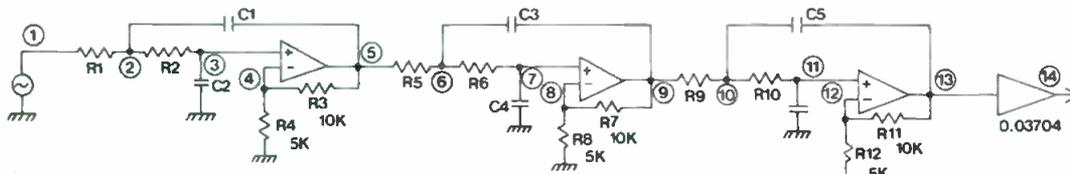
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Seventh-order active elliptical filter used in Modulation Sciences MTS filter.

the same frequency. This could make the peaks too high for succeeding sections.

In its final form, a part of the filter is installed at the input of the generator, and the rest is at the output, after the noise-reduction circuit. With everything in place, the filter was checked for ringing and leakage simultaneously. As already described, the simulation program allowed a kind of test seesaw to take place, with ringing going down, "leakage" up, and vice versa. The designers were able, in a comparatively short time, to find the right circuit configuration that put both ringing and stop-band leakage below troublesome levels.

With the ringing under good control, transient response was judged excellent. As already noted, heavy ringing means poor handling of transients. The simulation program was especially valuable here.

The general characteristics of the completed filter are as follows: Flat response is maintained up to 15 kHz, while response above that is carefully controlled. The attenuation in a 1 kHz band centered on the pilot frequency is sufficient to maintain a 30 dB signal-to-noise ratio for the pilot, and attenuation above 16-468 Hz is sufficient to prevent the sum channel signal from interfering with the difference signal, or vice-versa. Transient response (ringing) is controlled so that modulation levels do not have to be lowered significantly to prevent the ringing from overmodulating. While the phase response of each individual filter need not be tightly controlled, the sum and difference filters are very closely phase-matched out to 14 kHz, to maintain good stereo separation. In addition, all of these specifications are maintained over a reasonable temperature range.

Thus, with the guidance of the com-

puter, a filter emerged that does what it is supposed to do, in the middle of a device that includes audio processing, audio matrixing, a vulnerable pilot signal, four audio channels (three of them on subcarriers generated in the device), a complicated noise reduction system, integration with the station's horizontal sync frequency, and very precise monitoring and control of each separate output.

The completed filter can be made with commercial components in a cost-effective system. Thorough skill in advanced filter design was essential. But without the computer, even that skill would have been hard put to avoid prohibitive costs in design and construction, on top of performance that might well be less than the best. **BM/E**

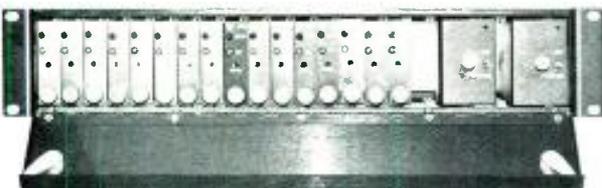
Robin Lanier, formerly *BM/E's* senior editor, is now an independent writer and consultant living in New York City.

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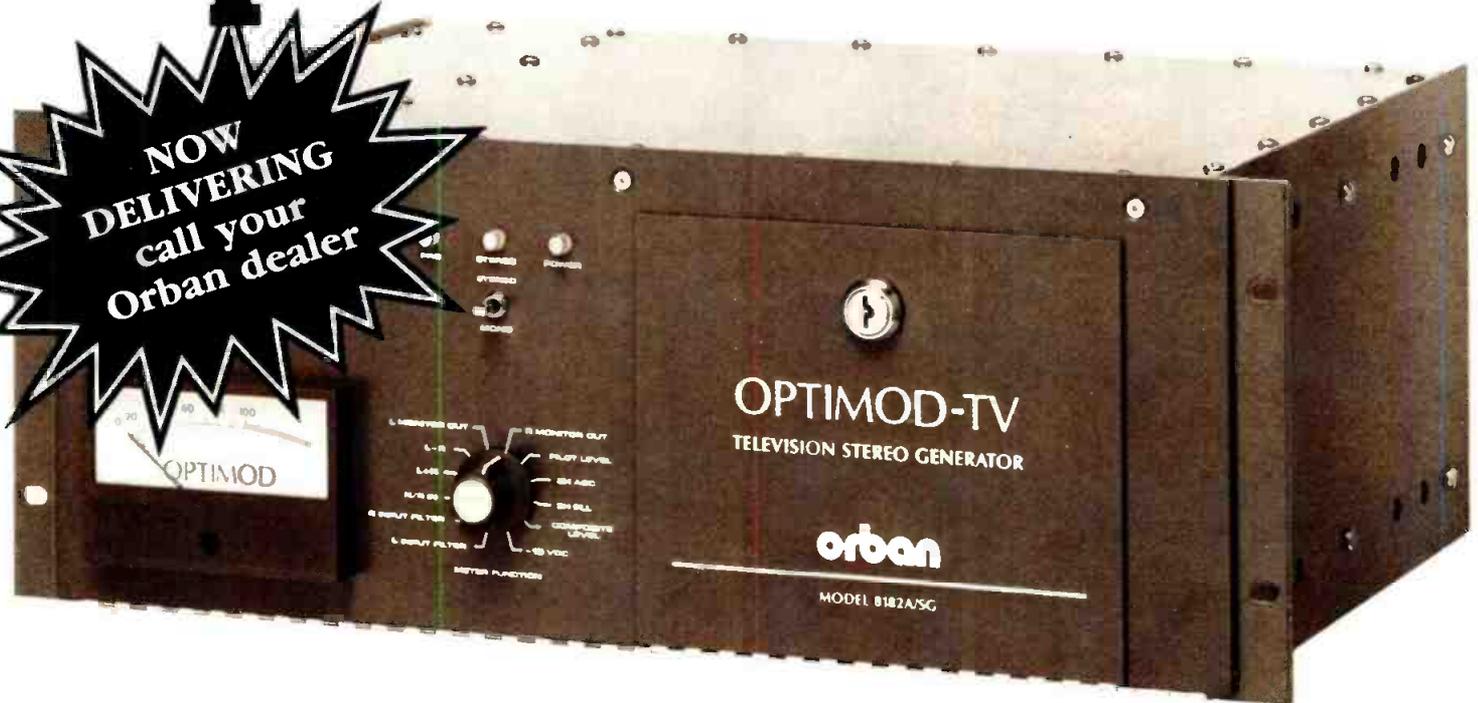
*National Academy of Television Arts and Sciences award for technical achievement, 1983-1984.



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- Sync can be derived from either program video or sync bus to simplify installation. Video loop-through is provided.
- A built-in monitor facility using a high-precision dbx *decoder* card to verify stereo generator per-

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Making tests and measurements was once a time consuming, tedious procedure. A lot of knobs had to be set and adjusted before a reading could be taken, and a reading might have had to be taken of an oscilloscope graticule and multiplied on a calculator or plotted point by point on graph paper.

Today, however, there are an increasing number of systems which can make automated measurements. Pressing a single button can take care of a whole slew of functions. All it takes for the operator is to set up the programmable instruments, then observe the results on a CRT or have them printed out in hardcopy form. What's more, if measurements are needed in the field, more portable equipment is now readily available.

Automatic testing may not always be right. For one thing, programmable equipment is costly, and may not always be the answer to the problem. And in some situations, an elaborate automated test setup may represent overkill when all that is required are a few knowledgeable technicians to troubleshoot the difficulty—engineers with a "gut feeling," of which a machine is incapable.

Nonetheless, the new automated technology represents a significant step forward on several fronts. Besides being extremely accurate and totally repeatable, what all of these advances mean is that now that testing is so easy and quick, broadcasters need not keep putting it off—monitoring can now be done on a frequent regular basis. One advantage to this is that regular monitoring could reveal and track gradual deterioration rates that will lead to eventual failure, making the scheduling of maintenance a whole lot easier—and avoiding a possible catastrophic failure.

Microprocessor control

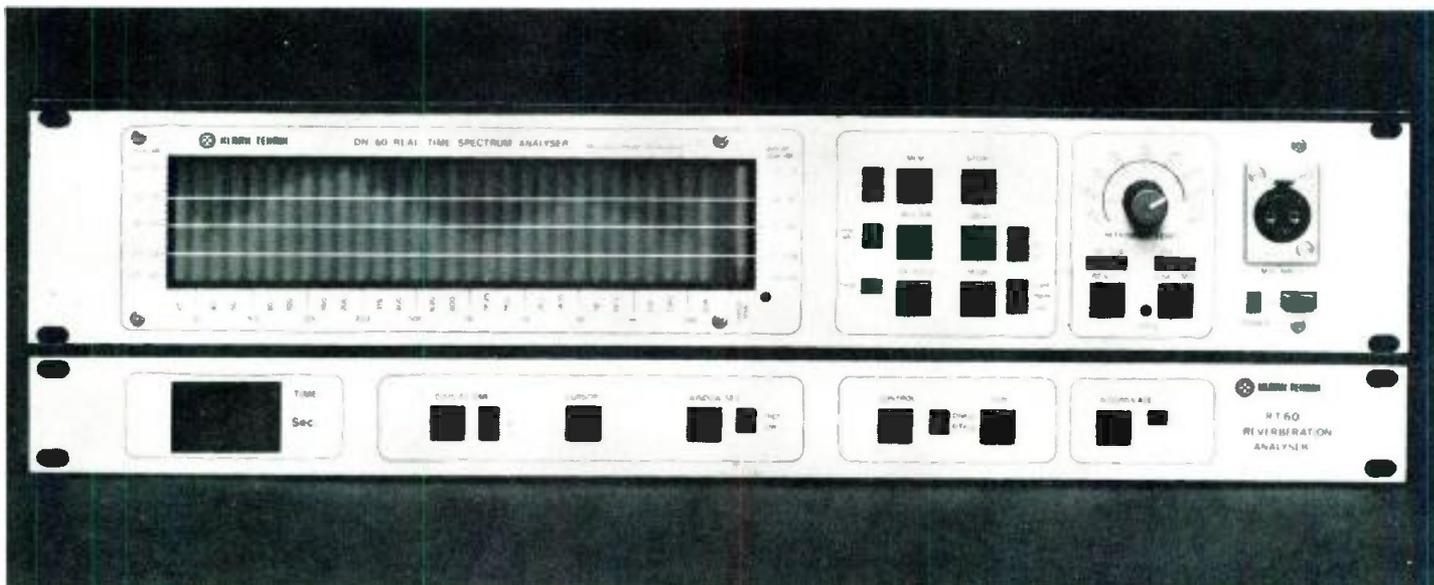
The basis for the new developments in automated testing is, of course, the microprocessor and its associated ROM, PROM, and EPROM memories. These lie at the heart of the testing procedure, their reliability and accuracy far greater than the human perception system with its individual variances and "off days." The microprocessor also allows another important feature in test and measurement: the ability to program the tests and individually customize them for a particular user's needs. Thus, parameters can be entered with the system set to issue some form of alarm if they are

THE AUTOMATED FUTURE OF AUDIO TESTING

By James Lippke
Editor Emeritus



Audio Precision's System One selects entire test procedures or changes instrument settings via an IBM PC.



This real-time spectrum analyzer from Klark Teknik, with LED bargraph display, can be programmed for automatic tests.

exceeded. Or the sequence of tests can be set, with some routines programmed to run more often than others.

One of the most important companies to take advantage of microprocessor control is Amber, whose 3501 Distortion and Noise Measuring System, with pushbutton setup, includes automatic servos that handle voltage level and calibration, thus eliminating knob twisting. Amber's latest programmable unit, the 5500 automatic audio analyzer, introduced in 1984, goes even further. Designed with the broadcaster in mind, it can be connected to fully balanced studio equipment, for example. Output extends to +30 dBm. As an audio distortion and noise measurement system, the 5500 measures total intermodulation distortion (to SMPTE/DIN, CCIF, and IHF standards) rather than only harmonic distortion.

Although the 5500 can be controlled by the front panel (laid out for comprehension), one of its most impressive attributes is that it can be programmed through the keyboard and set up to do just about anything. Test stimulus, for instance, is provided by a programmable frequency and amplitude generator, with direct numerical values entered from the keyboard whose up and down keys are used to increment or decrement the oscillator, set the magnitude of the increment, and the scale (percent, dB, V, etc.).

The device being tested can have programmable gain and programmable frequency filters and signal amplitude detectors. A wide range of filters can be programmed into the 5500. Software also allows the user to program the 5500's 10 EPROMs to perform 10 dif-

ferent measurements, activated by a single keystroke.

Somewhat earlier, in 1983, Tektronix came out with its 5000 Series audio test system, built around the SG5010 signal generator and AA 5001 audio analyzer. The system was conceived to be operated by an external computer, though it can do stepped sweeps from internal programs. (Amber claims to be more flexible.) Tektronix does offer some of the best specs in terms of its low distortion oscillator and the resolution of its output level. Its IMD filters come standard (they are an option with Amber). Both Tek and Amber run their IMD tests out to 100 kHz.

Another computer-controlled test system, the Re Instruments RE 201 dual-channel audio analyzer, was developed primarily for test labs. It makes nine measurements, including transient intermodulation distortion and phase. The unit boasts a LEARN mode and an IEEE bus. There will undoubtedly be further advances in what is offered to the industry.

FSK automation

The latest automated audio test system to hit the market is the NAB-introduced 3000 Series from Sound Technology. It consists of the 3100A programmable generator and 3200A programmable analyzer—two completely separate two-channel instruments.

According to Sound Technology's Kent McGuire, a unique feature of the system is that generator and analyzer can communicate with one another over the same feed that is being tested, using a frequency shift keying (FSK)

technique. It is thus possible to have the generator set up at the transmitter site and the analyzer back at the station, with proofs and analyses run completely automatically with no additional cable connections. In a satellite network, a generator can be used at the origination point with analyzers set up at remotely scattered receive sites. Once the analysis is performed, results can be fed back to a central engineering headquarters automatically, using standard telephone modems and RS-232 communications from the various analyzers.

The on-board microprocessors also allow for complete front-panel programmability when not being used in an unattended situation.

The generator outputs sine waves from 1 Hz to 100 kHz, with typical 0.001 percent harmonic distortion within the mid-band. The output can be programmed in 0.1 dB increments from +30 dBm (600 ohms) to -90 dBm. Outputs are balanced, and the user can select input impedances of 600, 150, or 50 ohms. The generator will also produce square waves from 10 Hz to 50 kHz with less than 1 μ s risetime. SMPTE IM is available as an option, as is tone burst with the same bandwidth as the sine wave.

The programmable analyzer performs a large number of automatic tests, including: flat and filtered level; S/N; total harmonic distortion vrs. frequency and level; SMPTE IMD; phase, in degrees of time; and channel separation from 10 Hz to 100 kHz. Two digital readouts monitor the level in volts; watts/8 ohms, and millivolts; distortion in percent and dB; phase error in de-

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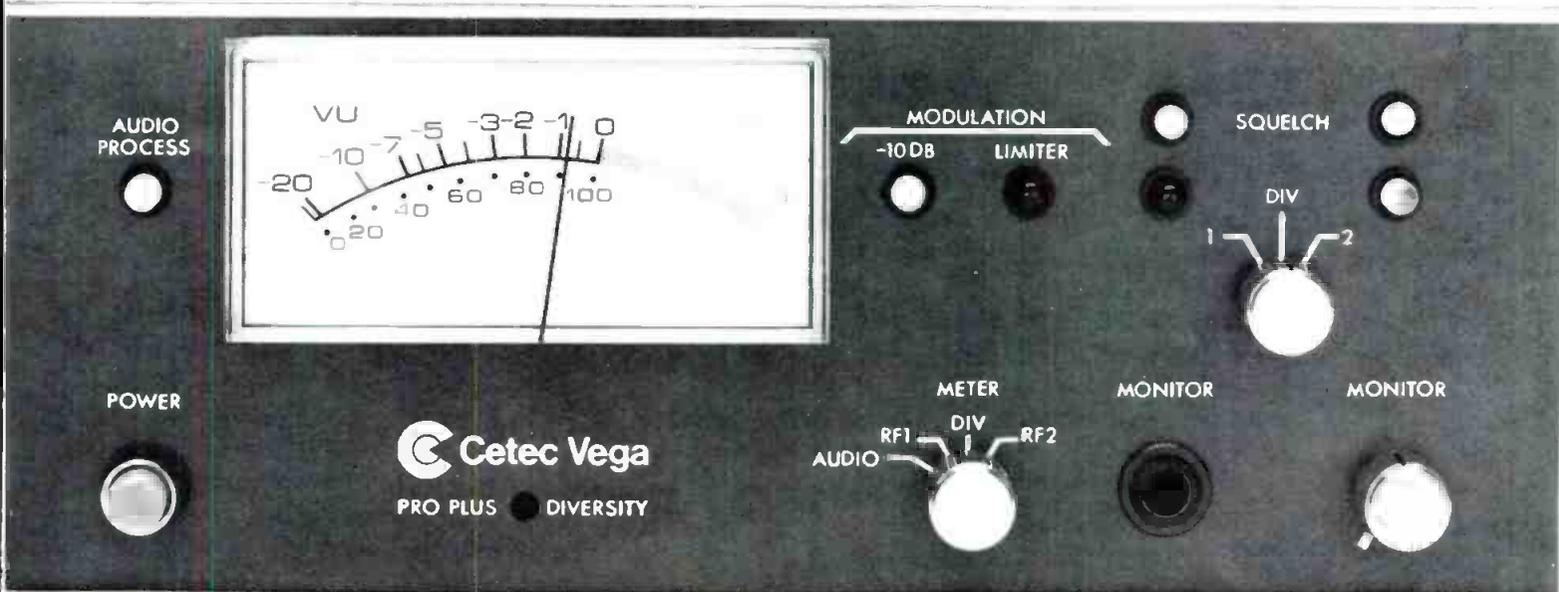
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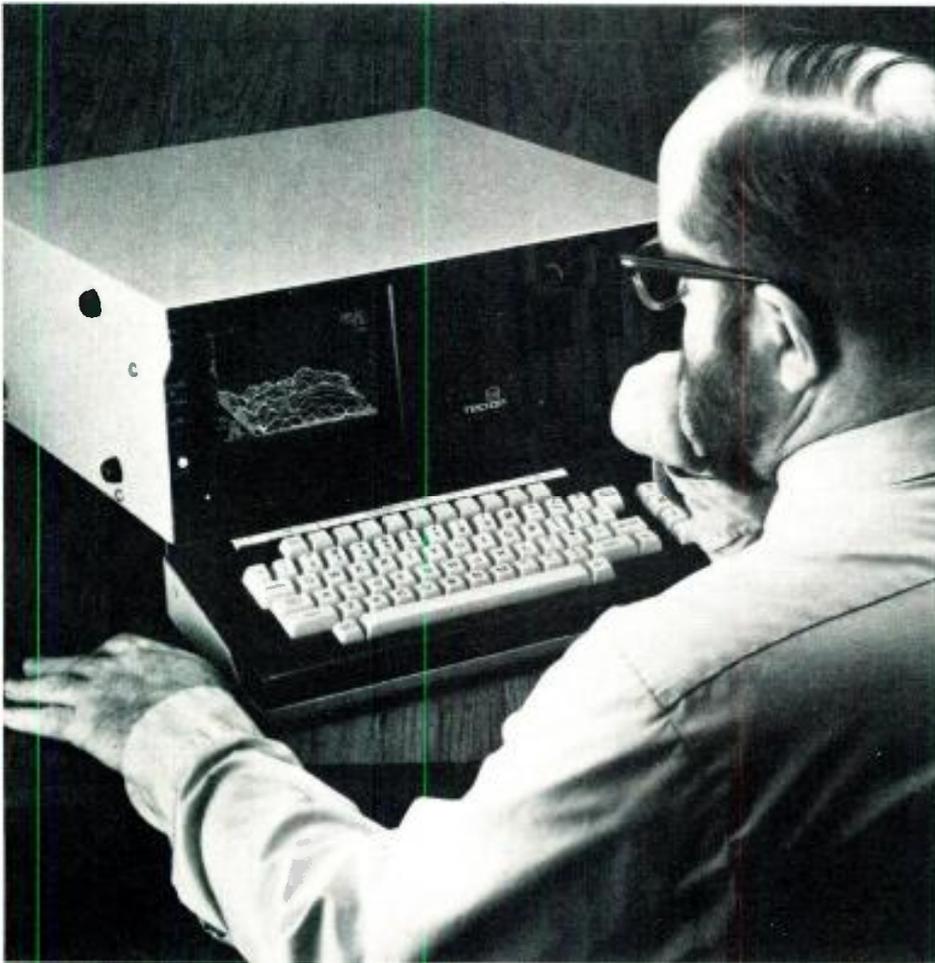
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The Tecron/Crown System 10 acoustic analyzer includes its own internal computer and floppy disks for storage of data.

degrees or millisecond and microsecond; frequency in Hz and kHz; and separation in dB. For those who are still not totally comfortable with LED readouts, an analog meter is also provided.

PC-based display

The basis for any automated test system includes both the microprocessor and PROM or EPROM memories for performing the tests, and an output driver that will display the results on a screen of some kind or print them out. The two functions—analysis and display—can be combined in the same unit, as in the systems described above. But with the increasing number of personal computers on the market, it is becoming almost commonplace to split the functions, and use the PC for display.

One of the first companies to get involved in this kind of programming was Eventide. It offers software for use on an Apple computer which takes the output of the Eventide spectrum analyzer and displays it on the Apple screen. The cost for the software is only \$600, which, added to the cost of the spectrum analyzer, comes out to be a far less

expensive package than an analyzer with built-in display.

Today's more sophisticated measurement systems are taking the analyzer/display interface even further, using the personal computer to not only simply post the measurements on the screen but to also do some of the number crunching and housekeeping required in more complex measurement series. Thus rather than needing to dedicate massive ROM storage in the analyzer instrument, EPROMs in the PC can be accessed by the analyzer through a high-speed IEEE 488 bus. The two units working in tandem—analyzer and PC—thus take advantage of the best features of both, while helping keep the cost down. (The PC, of course, can also perform other tasks not related to the automatic testing.)

Last month's NAB show saw System One, a brand-new audio test system from a brand-new company, Audio Precision, staffed by the team that designed and built the Tektronix automatic distortion analyzer. System One performs tests three to 10 times faster than previously-available equipment, and does it with impressive specs: residual noise (1.5 microvolts; distur-

tion (0.001 percent; level measurement accuracy 0.1 dB; generator output level 26.6 V open circuit, +30 dBm into 600 ohms; and flatness 0.05 dB.

System One is designed to be operated with an IBM PC, communicating over an IEEE 488 bus. This architecture allows the results of the test to be instantly analyzed and graphed in color on the PC's screen as the test is in progress. Results can also be printed out on a color graphics printer.

The PC's screen and keyboard are also used to issue instructions to the analyzer, through a menu-prompted routine which allows setting up test sequences. System One performs all the basic test procedures—level, noise, frequency, and harmonic distortion—through software modules. The basic system price, including these modules and a high-level balanced generator, is \$5225.

Responsive to marketplace

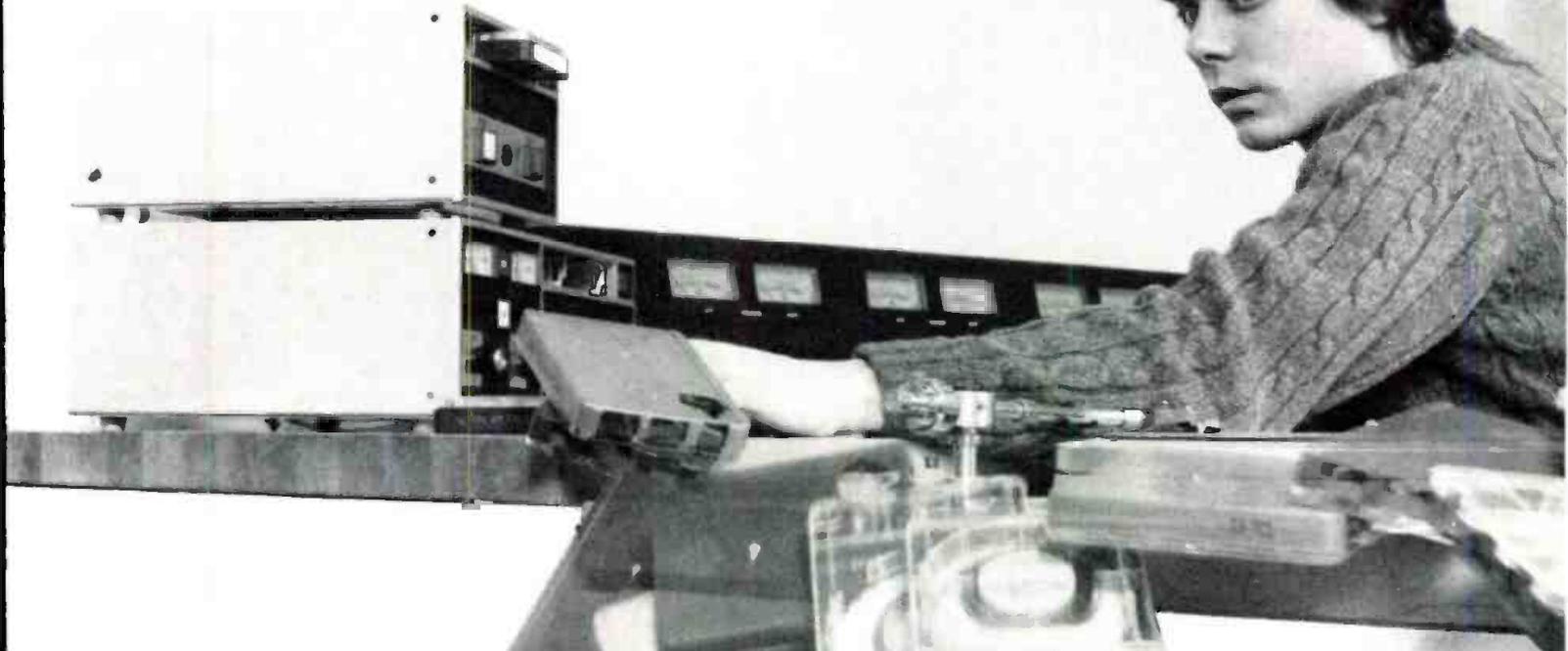
Audio Precision president Robert Metzler envisions his company making a contribution because of its ability to respond to the marketplace. "The giant broadline companies don't pay enough attention to audio because management perceives the audio markets as being too small and of limited growth rate. The small one- and two-engineer companies, while innovative in the past, will be resource-limited when it comes to software, digital signal analysis and synthesis, and state of the art human interface. And those low-price manufacturers who supply service and repair shops simply won't deliver the quality level that is needed in professional audio."

Metzler points out that automatic testing is a must for facilities with multichannel consoles, 50x50 routing switchers, and the like.

Wayne Jones, president of Amber, echoes Metzler on some areas and goes further. He believes greater public awareness of high-fidelity sound, brought on by better receivers, digital compact discs, etc., will require broadcasters to routinely check the audio chain—which often includes multichannel consoles and improved tape cartridge machines. "Add to this the additional measurement demands of AM stereo which requires literally hundreds of individual measurements for a proof," he notes, "and you have a very demanding task."

Jones sees his 5500 system as a powerful benchtop instrument just as it is—fast and easy to use. But he envisions a

It's no wonder 5 out of 6 cartridge tapes sound bad. Phase Fixer makes them sound good.



Even the best tape machines... even the finest cartridge tapes fall prey to sound-robbing phase error and flutter. Carts are dropped. Pressure rollers wear. Playback heads get dirty. But now the revolutionary Harris Phase Fixer audio time base corrector virtually eliminates phase error and flutter. The Phase Fixer is a twin pilot tone system employing high quality 16-bit digital audio.

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is acceptable one day can be made a dud the next... simply by being dropped.

How Phase Fixer works

The Harris Phase Fixer consists of two compact rack-mounted units. The first, a pilot encoder, injects an inaudible pilot signal on the audio as it is recorded onto tape. The second unit is the time base corrector. When an encoded tape is played, the time base corrector is automatically enabled, *electronically* reducing stereo phase error and flutter to insignificant levels. Tapes that are not encoded will play normally.

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greater benefit when it is tied to a personal computer, printer, plotter, and routing switcher. The data can be in whatever form the user wants it, as we suggested in the opening paragraphs of this report. It will be date and time stamped and guaranteed to be complete and accurate. The computer can further generate summary reports "to analyze and project trends," says Jones.

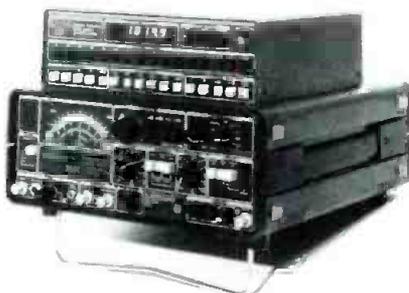
Programmable instruments abound

While automated audio analyzers integrated with computer systems is suggested as the wave of the future, programmable test instruments are certainly here now. Indeed, programmable spectrum analyzers have been commonplace for several years, many units displaying 30 or 31 frequencies simultaneously on 30x15 or 16 LED matrixes.

Worthy of evaluation is the Ivie Electronics palm-sized IE-30A. This unit could be incorporated with the IE-17A microprocessor audio analyzer to run through a host of measurements quickly: 1/3-octave real-time, one octave, room/time delays including rever-



The Model 5500 from Amber runs through distortion and noise tests automatically.



This Amber distortion and noise measuring system includes pushbuttons for easy setup and test.

beration. The microprocessor controls pulse width, time of analysis etc., making it a powerful unit. Further, the

microprocessor transfers any IE-30 screen pattern to an x/y recorder.

White Instruments has gone further, in its microprocessor-controlled System 200. Indeed, a description bears some resemblance to the Amber 5500 audio distortion analyzer. Features and functions are software-controlled; it's modular in concept and is therefore expandable; and it has eight nonvolatile memories for speed and convenience. White says filters are the heart of a real-time analyzer. Its filters are supplied on card for quick installation. Octave band, 1/3 and 1/6 filter sets are offered. The system has three smoothing time constants. It does both average and peak mode processing simultaneously; the user can look at or store both. It handles a 45 dB range. It is programmed to do three RT-60 extrapolated measurements simultaneously.

In terms of state of the art, perhaps Klark Teknik has gone further. It uses convenient LED bargraph displays but has incorporated advanced electronic filter technology along with microprocessor control. Both conventional and real-time analysis techniques are thus readily affordable to a wide section of the broadcast studio population for



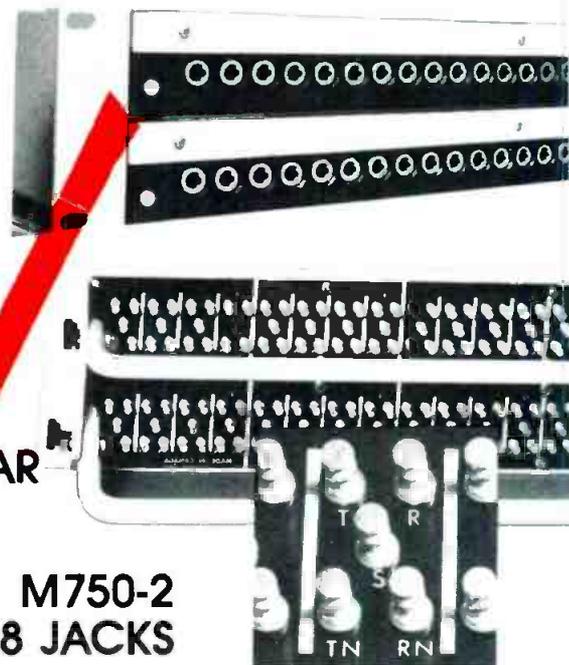
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diagnostics, maintenance or fast response checking. As a consequence, says Klark Teknik, the complete audio signal chain can be readily and quickly checked for frequency response, noise, crosstalk, distortion, and alignment.

The Klark Teknik Real Time Spectrum Analyzer DN 60 uses 30 $\frac{1}{3}$ octave filters at ISO recommended frequencies from 25 Hz to 20 kHz. Three memories permit recall of instrument status and allows resolution to be expanded after capture. Like the White unit, true peak and true average analysis modes are possible using different time constants for accuracy and versatility. Both electronic and acoustic measurements can be undertaken using balanced mic and line inputs or a calibrated measuring microphone. Interface allows for computer control and the connection of plotters. The DN 60 includes an on-board digital pseudorandom noise generator. (A portable noise generator is an accessory.)

Crown International's Tecron Div. has a new system that it describes as state of the art—the Tecron TEF/System 10. Bruce Bartlett describes it as one of the most powerful analytical tools ever made available. "It's a portable computer designed to make quick, accurate measurements of room acoustics and circuitry. It comes in the form of a suitcase with a foldout keyboard.

"The TEF/System 10 generates a frequency sweep into an audio system, then picks up the response to the sweep through a tracking filter. This filter greatly increases the signal-to-noise ratio of the measurement. In measuring studio acoustics, the tracking filter can be time-offset to help the operator look at only the direct sound, certain sound, certain sound reflections, or both."

Bartlett says the analyzer measures frequency response, phase response, and time response of any piece of equipment or a system. "Unlike a $\frac{1}{3}$ -octave analyzer, the unit can provide finer frequency resolution and can display phase and time information. It can even make anechoic measurements of microphones or loudspeakers in ordinary rooms." The unit includes two built-in disk drives for storing test data.

In short, for the engineer who wants to be really sure of his measurements, who wants to do them rapidly, and who needs repeatability, automatic audio testing has the answer. And given the declining prices of the microprocessor and microcomputer, price may no longer be a deciding factor. **BM/E**



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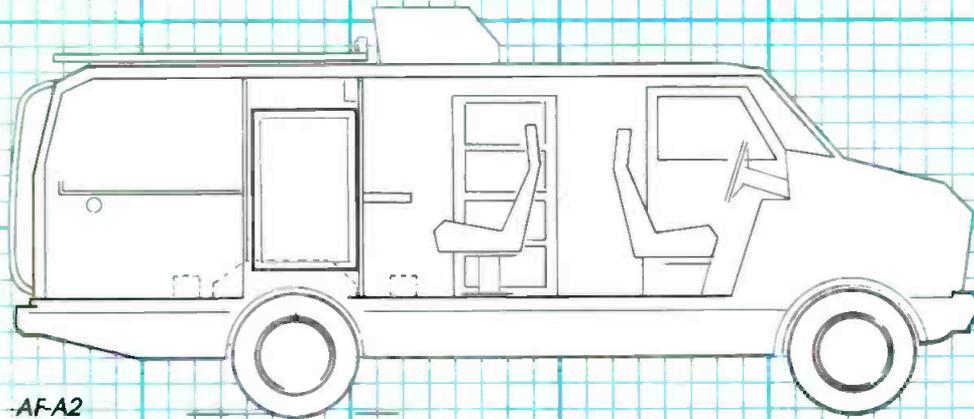
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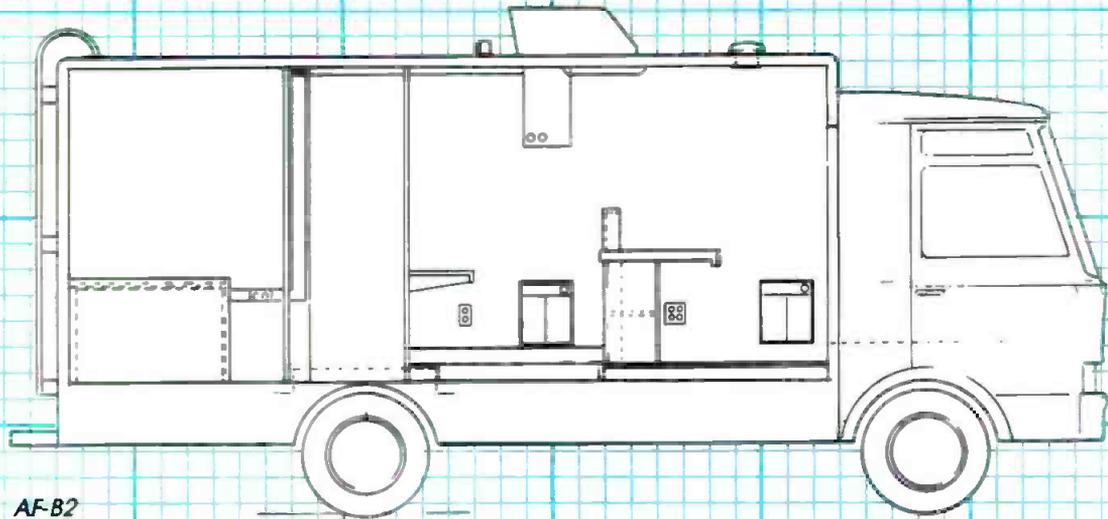
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Eliminating Some Restrictive Policies

By Harry Cole, FCC Counsel

In connection with its continuing program of deregulation, the Commission took steps last month both to eliminate certain restrictive policies from its books, and to propose the elimination of still others. In virtually each case the Commission justified its actions by saying that some other forum—whether a court, another administrative agency, or a private organization—was available for consideration of the questions which had, up until then, been considered by the Commission as well. The FCC's approach to these matters, while undoubtedly sound in some respects, raises interesting questions.

Eliminated policies

The policies eliminated by the Commission center on various business practices of broadcast licensees. They include:

- The prohibition against providing false information to alter the outcome of an audience rating survey.
- The requirement that broadcasters exercise "special diligence" and use "extraordinary measures" to assure that conflicts of interest or related situations involving station personnel do not occur which could result in the violation of sponsorship identification provisions of the Communications Act.
- The requirement that broadcasters disclose the existence of any arrangements by which sports announcers are selected or paid.
- The general, related concerns previously expressed by the FCC about the use of a station to promote other, nonbroadcast businesses owned by the licensee, and also about the use of a station to obtain personal advantage for the licensee in other business areas.
- The limitations on language which can be used by a station in concert promotion announcements.
- The policy under which a broadcaster's partial or nonperformance of advertising contracts could be deemed to raise questions concerning the licensee's qualifications to remain a licensee.
- The requirement that each broadcast station have a policy or internal system with which to protect against the

broadcast, by the station, of deceptive advertising, and the similar requirement that each licensee research the reliability and reputation of each prospective advertiser.

The formal rules which the Commission has proposed to eliminate prohibit fraudulent billing, network clipping and certain combination rate and joint sales practices.

Discouraging undesirable conduct

In general, the FCC justified its actions and proposals by noting the availability of some mechanism other than the Commission's processes by which the undesirable conduct could be discouraged or corrected. For example, the Commission suggested that ratings services themselves can police their own ratings efforts to prevent distortion, and that complaints by broadcasters could be brought to the attention of either the ratings services, industry-wide organizations such as the Electronic Media Rating Council, or the Federal Trade Commission. Similarly, any fraudulent or unfair trade practices which might have otherwise been proscribed by the various policies in question could be dealt with by the FTC or through the initiation of private lawsuits in local or federal court.

Finally, the Commission concluded that, in some cases, the policies which it had adopted and (at least to some extent) enforced over a period of years were simply unnecessary. This was particularly true with respect to the "sports announcer" policy. That policy was created more than 10 years ago to "prevent deception as to possible lack of objectivity based upon the private interest of the announcer." Now the Commission believes that "the sports-oriented audience which listens to or views [sports] programs seldom objects to announcers who favor the 'home' team; indeed, many fans may prefer this."

Practical aspects

Before you decide to try to take advantage of the FCC's recent actions, you should focus on a couple of practical aspects of those actions. First, in eliminating or proposing to eliminate the policies in question, the Commission was clear that it was *not* abandoning its traditional concern about the character qualifications of its licensees, a concern which is mandated by the Communications Act. For

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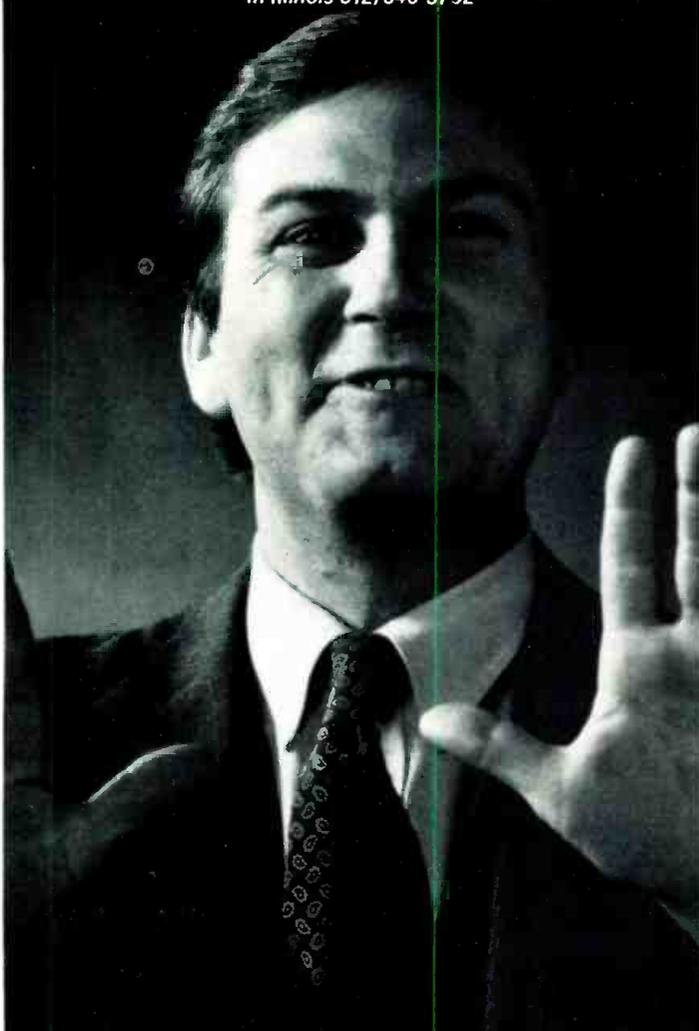
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approximately four years the FCC has been considering how "character qualifications" questions in general should be assessed. Historically, the Commission has taken them on a case-by-case basis, a method which has not always led to a completely consistent and rational precedent. In 1981 it initiated a formal inquiry to consider alternative means of approaching such matters in the hope that a single, simple, consistent procedure could be developed; that proceeding has still not been resolved. Notwithstanding this nonresolution, the Commission is obviously still interested in the character of its licensees, and will continue to investigate serious allegations about possible lack of character qualifications.

In abandoning the various policies described above, the Commission took pains to point out that that abandonment did not constitute overall approval of the business practices which were restricted or prohibited under the former policies. Rather, it is the practices themselves which will no longer be appropriate for Commission consideration in the first instance. That means that the FCC is not going to be willing to hear, and investigate, complaints that this broadcaster or that broadcaster may be involved in any of the "deregulated" business practices.

Proper business practices

This distinction may seem somewhat elusive, but it is indeed important from the Commission's point of view. In essence, the Commission does not view itself as the governmental agency with primary responsibility for ferreting out, investigating, trying and judging allegedly improper business practices. Such efforts require substantial amounts of personnel time and agency resources which, in the Commission's view, could be better allocated elsewhere. But if some other agency or court better suited to the initial fact-finding task should conclude that a broadcast licensee has been guilty of some misconduct, the FCC will certainly be willing at least to consider the impact that that misconduct may have on the licensee's qualifications. Thus, broadcasters should not view the FCC's latest deregulatory effort to be an open invitation to adopt less than proper business practices.

The Commission's actions here are, of course, completely consistent with the deregulatory approach which it has been taking for more than three years now. But the actions described here are in some ways different from previous actions, and those differences may be entitled to certain considerations.

Recognizing the FCC's stance

As an initial matter, it is important to recognize that, in eliminating (or proposing the elimination of) the various policies described above, the Commission is not concluding that the conduct previously proscribed or restricted by those policies is now somehow all right. Rather, the FCC seems to acknowledge that the practices in question are, in fact, undesirable and improper. This is different than, say, the FCC's determination that it no longer really cares how much commercial time a broadcaster chooses to air each day. That latter question involves no moral/ethical component, while the matter of improper business practices clearly does.

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Secondly, it is important to critically consider the Commission's somewhat facile willingness to rely on the existence of other agencies for the initial determination of whether or not misconduct has occurred. Certainly there exist at both the federal and state levels courts and agencies which deal routinely with business practices. But a number of the practices at issue here—for instance, the matters of combination sales or audience ratings distortion—may involve questions peculiar to the broadcasting industry. This is not to say that the FCC is the only forum in which these questions can be adequately resolved; it is to say that the Commission may be the most appropriate forum because of its familiarity with the industry which it has regulated for 50 years.

Sharp business practices

Finally, let us examine briefly the availability of nonCommission mechanisms to combat sharp business practices such as fraudulent billing or network clipping. Any individual citizen, broadcaster, broadcast advertiser, audience-member, etc. may file a private suit or complaint relative to such misconduct. But in some, possibly many, instances the incentive to do so is not great because the injury caused by the practices is too widespread and the direct harm suffered by any individual is accordingly slight. Network clipping, for instance, may lead to general increases in certain consumer prices. But the increase likely to be experienced by any particular consumer is so slight that no such consumer is likely to raise the issue. By the same token, a national advertiser whose ads happen to get clipped would have to make a substantial investment of time and money to monitor enough stations to prove clipping and then to encourage the network to take steps against the offending station(s). And if any one individual or network advertiser did raise and prove such misconduct in, say, a private lawsuit, the actual damages the broadcaster would have to pay might not be great. By contrast, under the Commission's former regulatory framework, a licensee's very license, its right to conduct its business, was immediately threatened if such misconduct were alleged and proved.

The difference is clear: under the new deregulated approach, the incentive to avoid misconduct is being substantially diluted. By requiring that aggrieved parties prove their cases elsewhere, the Commission is erecting a significant fortification protecting existing licensees from this kind of threat to their licenses. The fact that a licensee could, under the old system, be threatened much more easily probably created a much stronger incentive toward proper business practices.

Appropriate balance

It could be said that the Commission's recent actions effect a more appropriate balance between the interests of broadcasters and the interests of the public. But if that is the case, the Commission should at least articulate that as an aspect of its rationale: the FCC should not, without critical analysis, be permitted to fall back on its repeated claims that deregulation is acceptable because of the existence of other agencies or courts.

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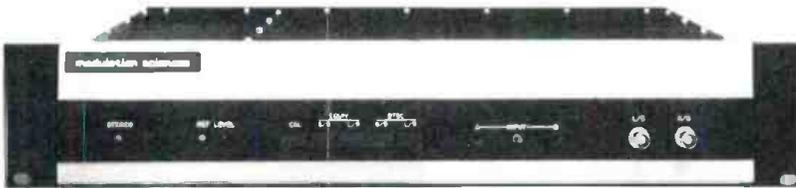
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broadcast EQUIPMENT

Stereo Reference Decoder from Modulation Sciences



Responding to industry demand for a way to accurately calibrate TV stereo generators, TV stereo equipment maker Modulation Sciences has introduced the first MTS stereo reference decoder.

It enables stations to calibrate their stereo generators to BTSC standards. It will verify the performance of any stereo generator on the market including Modulation Science's own TSG.

CIRCLE READER SERVICE #260

The SRD is designed for fast, easy setup and other features include contact closure for remote stereo status indication, use with multiple sources without time-consuming recalibrations, stereo separation specs of greater than 50 dB in equivalent mode, and also greater than 40 dB in BTSC mode at all modulation levels. The price of the SRD is \$4750. It will be available in June.

JVC Adds Portable Mixer to Pro Audio Line

The JVC Professional Video Communications Division has introduced the SS-M208U portable audio mixer for both remote recordings and studio applications.

Small enough to be a desktop or portable unit, the mixer has flat frequency response and low distortion. Pan pots are provided for each input, and levels can be adjusted to match the source. The mixer has eight XLR mic inputs, all balanced, and inputs five through eight have RIAA equalization. There are LED peak



CIRCLE READER SERVICE #261

level indicators for the inputs and fluorescent level meters for the outputs, plus a headphone jack for monitoring.

ADM Audio Mixing for Video

ADM Technology has a new audio mixing product, the Post-Pro, designed specifically for video editing. It's available with eight or 12 adjustable line level inputs, each one VCA-controlled and featuring ADM's patented Slidex spiralinear attenuator.

Each input is assigned to an A or B bus on the control panel, and editors can crossfade between the two



CIRCLE READER SERVICE #262

through the VCA control. This allows true stereo and/or multiple input crossfades. In addition, the

Modifications for ENG/EFP and Studio Cameras

Film/Video Equipment Service Co. is offering the J-6 Zoom control system for Canon J13x9 and J18x9, and Fujinon A14x9, A14x10, A12x9 ENG/EFP lenses, and for Angenieux, Canon, Fujinon, and Schneider one-inch and 1¼-inch tube studio cameras.



CIRCLE READER SERVICE #263

The J-6 zoom control system provides a wide range of variable zoom rates, from two seconds to 30 minutes or more. The control can be operated remotely, or mounted directly to the tripod handle by means of a special jogrip. Prices for the J-6 zoom modification start at \$4400, and there is an extra charge for ENG/EFP models without built-in tachogenerators.

**FOR MORE INFORMATION
on these products, use the
Reader Service Card.**

Post-Pro can operate simultaneously under full editor control, full manual control or partial editor, or partial manual control. It can also have a three-band in-line equalizer with high pass/low pass filter to allow limited amounts of "sweetening." A parallel GPI is built-in and included in the base price of \$9500 for the eight-input unit and \$12,500 for the 12-input unit. An optional serial interface costs \$2495 and the three-band continuous variable EQ with HP/LP filter is \$230.

BROADCAST EQUIPMENT

New Engel RGB Sequencer

Engel Engineering has announced a new model red, green, blue sequencer, the Model SEQ-1A. It enables display of RGB on a line scope or oscilloscope and is designed for film to tape color correction, computer graphics and animation, and editing rooms with new component video switchers and VTRs. Inputs include one each for red, green and blue video, and sync, and video inputs are loop through; outputs are video, staircase and sync. The sync output is a composite signal to eliminate flicker problems. The unit is only 1 3/4 inches high.

CIRCLE READER SERVICE #264

FOR MORE INFORMATION
on these products, use the
Reader Service Card.



CIRCLE READER SERVICE #265

La-Kart from Lake

Lake Systems Corp.'s new video cart system, La-Kart, now incorporates dual-channel audio for stereo or bilingual operation. Stations still have a choice of tape format: either half-inch Beta or M and U-Matic.

Programming is done with Lake's own Broadcast Software on a 68000 microprocessor. Features include random accessing between decks and the ability to store as many as 70 individual segments on each cassette. One other added feature is La-Kart's new program delay system.

Synthesized AM/FM Signal Generator from Leader

Leader Instruments Corp. has a new programmable signal generator, the LSG-202. One hundred test condi-



CIRCLE READER SERVICE #266

tions of frequency modulation and output can be stored in memory which is protected by a battery backup.

The frequency range is 1 to 520 MHz in 100 Hz steps. AM modulation (0-90 percent), FM (0-100 kHz) and 0-50 kHz modulation (32.5-65 MHz) are available by external or internal signals at 300 Hz, 400 Hz, 1 kHz or 3 kHz. Reverse power protection with automatic recovery is provided to prevent damage to the output circuits from accidentally keyed transmitters.

Symetrix Single-Ended Noise Reduction

A revised version of the Symetrix 511 single-ended noise reduction system, the 511A, has been announced by the company. It is a "noncomplementary" system which doesn't use the traditional encode-decode processing. The 511A eliminates noise by processing the incoming signal with a voltage-controlled dynamic filter in series with a "soft-knee" downward ex-

pander. The two channels may be used each as mono or linked together in the stereo mode with equal amounts of noise reduction in both channels. The 511A can remove existing noise from prerecorded tapes or other noisy audio sources including mixing consoles, effects and processing devices. The cost of the unit is \$595.

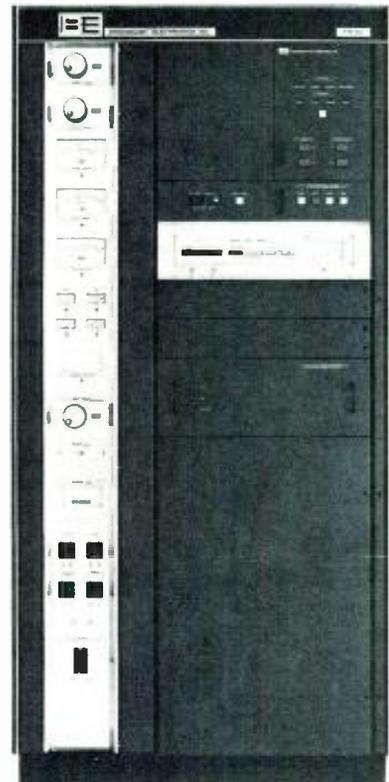
CIRCLE READER SERVICE #267

BE Brings Out New Single-Tube Transmitters

Expanding on its FM-30 single-tube transmitter technology, Broadcast Electronics has introduced a new low-power single-tube transmitter, the 5000 watt FM-5A.

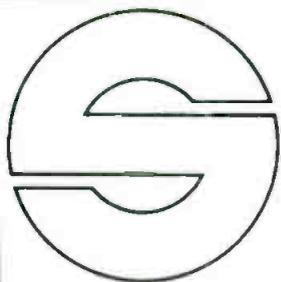
The new model incorporates the company's patented folded half-wave cavity power amp, broadband intermediate power amp, digitally-programmed FX-30 ultralinear exciter, and a second generation digital control system.

The single-tube transmitter was designed to weather adverse transmitting conditions such as lightning or output mismatch. The FM-5A uses a single Eimac 4CX3500A tetrode to provide more than 5 kW of RF on any frequency between 87.5 and 108 MHz. Other features include a digital control system, simplified input circuit and remote control. The transmitter has a compact design taking up only 8.5 square feet of floor space. There is also rack room for BE's FS-30



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stereo generator or FC-30 SCA generator.



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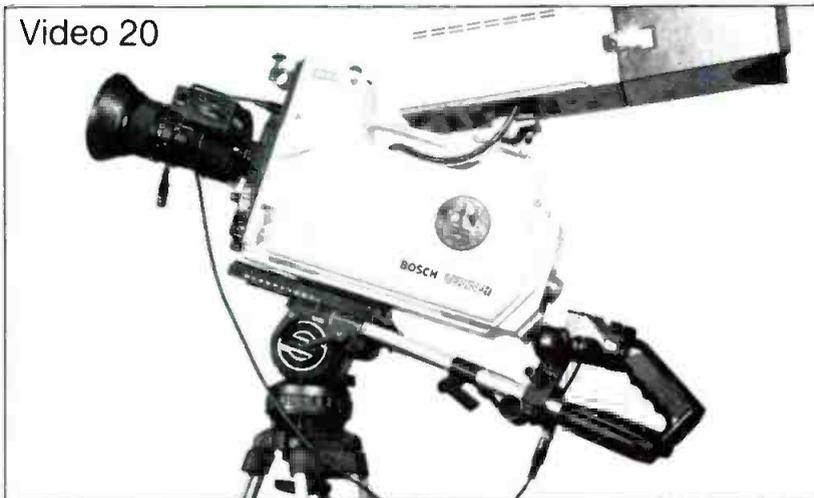
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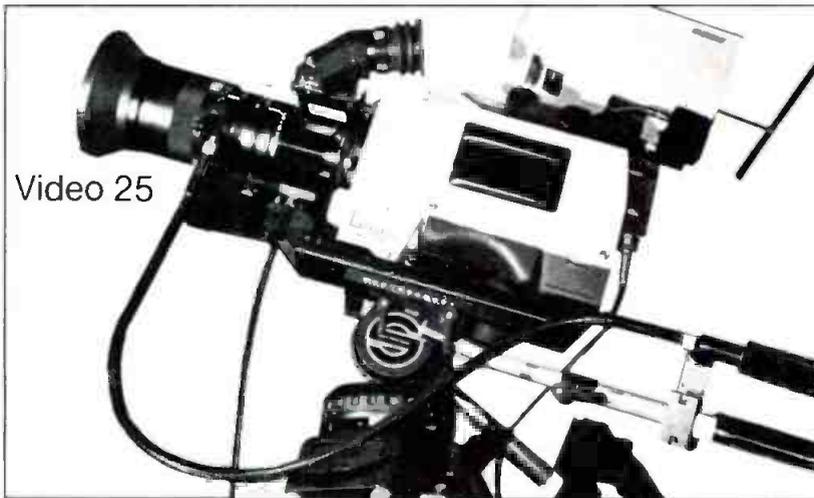
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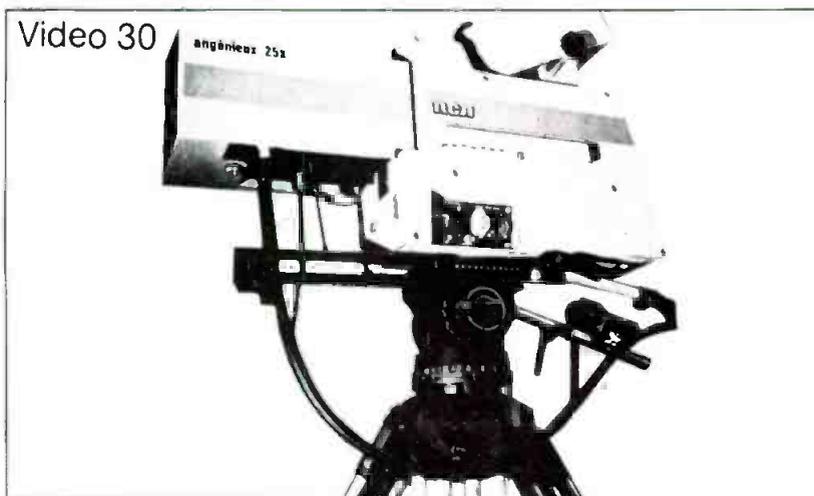
Video 20



Video 25



Video 30



BROADCAST EQUIPMENT

IGM Communications Features Audio Control and Switcher

IGM has developed an audio controller with software designed for broadcast operations. All control and programming is accomplished in simple broadcast language commands with special function keys at each video terminal using menu-

driven displays and on-screen help. The controller allows up to 2000 preprogrammed events, expandable to 8000, and unlimited real-time commands. It also allows for full- or part-time live assist operation, and partial or full-time unattended control of any type of audio source equipment. The new computer-controlled switcher features solid-state audio switching.

CIRCLE READER SERVICE #269



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Ultra-Mini Midgi Cam

A wireless, two-ounce camera which is no bigger than a cigarette pack and can be fastened to the cap of a baseball player or inside the home plate umpire's field mask is finding its way into TV sports events. **CIRCLE READER SERVICE #270**



It was developed by Optical Resources, Inc., and while it's still being perfected, it is currently being used by superstation WTBS, under exclusive contract until April 30. The camera has an auto focus set for 12 inches to infinity, is available in both fixed (hardwire) and RF mobile configuration, and features 300 lines minimum resolution. It's pick-up device incorporates MOS technology and is designed to eliminate ghosting, lag and burn-in. A sensor contains the MOS circuitry and a processor contains integration and signal processing circuits, and the two may be separated up to 48 inches via a multiconductor interconnect cable. The camera has a -46 dB minimum S/N ratio, a minimum luminance of 35 lux, and a 3/8-inch C-mount.

TVRO Satellite Earth Terminals from GEC McMichael

The line of TVRO satellite earth terminals just introduced by GEC McMichael provide broadcast quality reception of programs from Ku-band satellites covering the frequency band 10.95 to 11.7 GHz. The terminals consist of a dish antenna and mount, a low-noise converter, and a satellite receiver. Antenna diameters range from 1.5 to 4.5 meters, and the receiver allows selection of 50 preset channels. An optional prewired equipment rack is available for multichannel systems of up to eight receivers.

CIRCLE READER SERVICE #271



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Maxell Improves U-Matic Videocassettes

Maxell Corp.'s Professional/Industrial Division has announced improvements to its line of 1/4-inch BQ and high grade U-matic videocassettes for ENG and editing applications. Maxell has introduced tensilized PET to its production techniques, and the product line features the company's Epitaxial coating combining ferric oxide, which provides sensitivity and high output in low to medium frequency ranges, with cobalt ferrite.

CIRCLE READER SERVICE #272

FOR MORE INFORMATION
on these products, use the
Reader Service Card.

Acrian 1 kW Solid-State FM Amp

Announcing it as a first for the broadcast industry, Acrian Inc. has a 1 kW solid-state amplifier for the 88-108 MHz FM broadcast band. The new FM1KW-IPM is a self-contained unit with output power exceeding 1100 watts, with 10 W of input drive into a 50 ohm load. The product incorporates Acrian's Isofet technology and includes combiners, splitters, monitoring, and control circuitry.

The new amp provides full outputs for remote monitoring of all parameters required by the FCC, thereby eliminating the need to develop support systems. It offers protection from output overload, input overdrive, overtemperature and overcurrent. The FM1KW-IPM specs include 20 dB power gain, 1

OWL Tower Light

EG&G Electro Optics has a new, FAA-approved, single enclosure obstruction warning light (OWL). The StrobeGuard SS-125 has stainless steel enclosures and a protective coating around PC boards. Its lighting arrestors are designed to withstand repeated 10,000 ampere current surges. Operated with either the SS-121 or SS-122 controllers, the system is self-activating for monitoring and identification of malfunctioning lights and can activate a remote alarm. Either controller can operate up to 32 obstruction lights. It measures 15 by 19 by 11 inches and weighs 82 pounds. The light uses less than .5 kVA of power. CIRCLE READER SERVICE #273



CIRCLE READER SERVICE #274

dB maximum gain ripple, -10 dB minimum input return loss, 50 percent minimum overall efficiency, 28 volt supply voltage, 75 amps typical supply current and 10 watts input.

Fluid Head Part of O'Connor Support System

O'Connor, maker of camera support systems, has a new fluid head designed with extra-heavy carrying capacity. The 100 HD provides smooth support for field and studio cameras up to 100 pounds. It features the dynamic spring-balanced O'Connor fluid head, O'Connor's sideloadable platform, dual-extendable handles and a wide choice of mounting platform bases including the O'Connor super claw ball. The

fluid head weighs only 19.5 pounds and can even handle cameras with prompts. It's available with three factory preset spring capacities of 600, 800 or 1000 inch/pounds and it costs under \$4000.

The new fluid head is included in O'Connor's 105 HD camera support system, which features a super claw-ball tripod, and has an internal adjustable spreader for stability.

CIRCLE READER SERVICE #275

Total Radio Recall.



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BM/E APRIL, 1985 127

BUSINESS BRIEFS

Florida teleproduction, video, and audio equipment manufacturer Industrial Sciences, Inc. has been purchased, and has changed its name to **Intergroup Video Systems, Inc.** Among changes initiated by the new management are a tripling of the research and development staff, the addition of a manufacturing engineering staff, and improved manufacturing procedures. . . .

Gotham Audio Corporation, New York City and Hollywood, has turned over all business activities of its subsidiary Gotham Export Corporation to a newly-formed company named **Gexco International**. . . . White Instruments was recently purchased by Carl Van Ryswyk, a former VP of engineering in the company. White will now be operating as **White Instruments, Division of C Van R, Inc.**

A record 78 percent increase in revenues for fiscal 1984 was announced by **Artel Communications** of Worcester, MA. . . . In other year-end sales results, **Conrac Corporation** showed a nine percent rise over its previous year's sales figures.

TFT, Inc. of Santa Clara, CA, has made its products available in the U.S. at over **40 dealerships coast-to-coast**. . . .

A/T Scharff Rentals has announced the opening of a new office in Nashville, TN, as well as the addition of a Sony 3324 24-track digital recorder to its rental inventory. . . . **Comprehensive Video Supply** has relocated its western regional sales office. It is now located at 2082 Michelson Drive, Suite 200, Irvine, CA.

Minnesota-based 3M and Artronics Inc., South Plainfield, NJ, have announced a **joint worldwide marketing and sales agreement**. Effective immediately, 3M will have exclusive sales and marketing rights to Artronics' computer-based graphics systems and software programs. . . . A newly-created design division is on tap for **Century III Teleproductions** of Boston. This division will create custom logo design and computer generated graphics and animation using the Quantel Paint Box, the Warren Smith Animation Stand, and the Bosch FGS 4000 3D Graphics Animation System.

VideoWorks recently completed the post-production on a series of promotional trailers for five motion pictures



Workers at Voice of America unload a 5000 Series routing switcher ordered from BSM Broadcast Systems of Spokane, WA.

including *Heaven Help Us*, which stars Donald Sutherland. . . . The American Film Institute has chosen **Varitel Video** to do post-production work on a preview tape of its 13-part series, *Starring The Actors*. . . . **Sony Corporation** has contributed two PCM-701 digital processors along with two SLO-420 Betamax videocassette recorders to National Public Radio. NPR will use the equipment when it premieres its *St. Louis Symphony Orchestra* series this month.

WWBT-TV, Richmond, VA, recently purchased three Fujinon P17x16.5ESM lenses for its RCA TK-47B cameras. . . . **Swiderski Electronics** has sold an EECO EMME Video Edit Workstation to Centel Video Productions, Oak Brook, IL. . . . **Kajem Recording Studios** of Gladwyne, PA, will soon become the first facility in the state to offer computerized Solid State Logic recording and

mixing. Kajem has taken delivery of an SL 4000 E Master Studio System equipped with the SSL Studio Computer. . . . **CMX Corporation** has included **over 90 new features and enhancements** in the software now being shipped to over 200 users of CMX 3400 videotape editing systems. . . . Dallas post-production facility **Video Post & Transfer** has installed a Montage Picture Processor.

A **Mitsubishi X-80 Digital Master Recorder** and two new Mitsubishi X-800 32-channel digital multitrack recorders were used in the production of "USA For Africa," a massive recording session featuring over 46 of the world's top recording artists. Proceeds from the single produced by the session, "We Are The World," and from the 12-inch extended play version as well as an album will go toward aiding the starvation victims in Ethiopia.

Hollywood production house **Starfax** has used its Rank Cintel Mark III Flying Spot Scanner to transfer from film to videotape six episodes of the Home Box Office series *Maximum Security*. . . . Also using the Flying Spot Scanner was **Editel/LA**, which recently transferred more than 300 of Columbia Pictures' first-run movies from film to one-inch B format videotape.

Beginning this spring, **United Video, Inc.** and **Accu-Weather** will begin the transmission of Accu-Weather Graphics through UVI's Zephyr Weather Information Service. . . . **Compugraph Designs**, New York City, recently completed an animated opening for WPIX-TV's daily entertainment show, *Best Talk in Town*, using its exclusive Bosch FGS 4000.

Among the personnel changes this month, John Bloomfield has been named general manager for the Spin Physics division of **Eastman Kodak**. . . . **Ikegami** has appointed Gordon Tubbs sales manager, Professional Products division. . . . At **Fortel**, John Patterson has signed on as national sales manager.

Ampex has named Neil Selvin marketing manager, digital video processing. . . . At **GTE**, Steven McClenaghan has been appointed marketing manager, special products for GTE's Lighting Products International Division.

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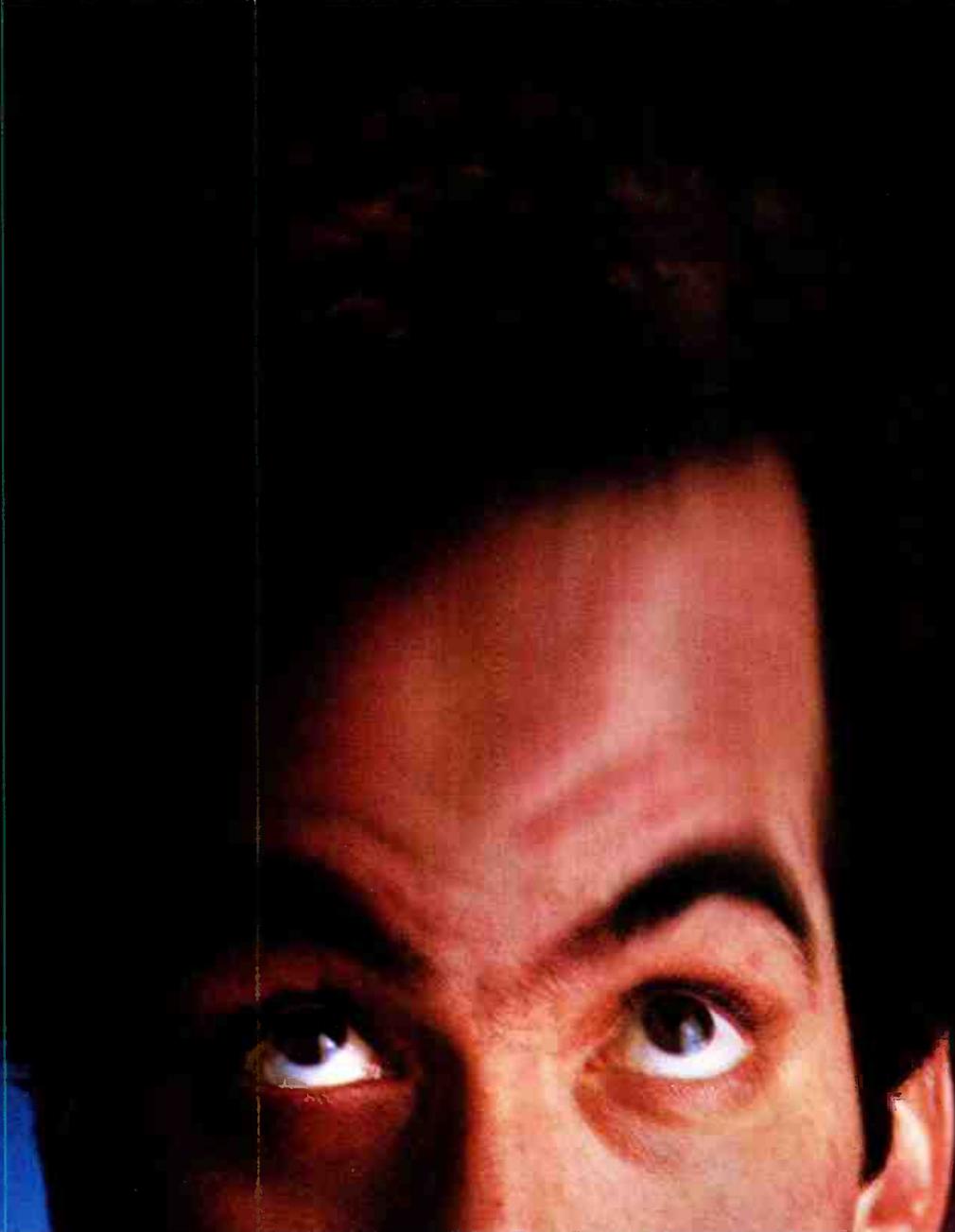


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Ward-Beck extended range meters are tailor-made specifically for the broadcast industry. These instruments measure audio levels over a sensitivity range of 80 dB with one continuous detented control.

The self-powered, 3 1/2" rack mounting units include LED status readouts and offer the choice of VU only (M405F), or dual VU/PPM (M405D) scales. The unique portable M405, with rechargeable ni-cad batteries, gives additional convenience and flexibility for measuring systems levels on a totally floating basis in those hard-to-get-at places.

The M405 Series . . . traditional Ward-Beck quality, carefully made-to-measure!



First by Design.

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