

SEPTEMBER 1985

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BROADCAST MANAGEMENT/ENGINEERING

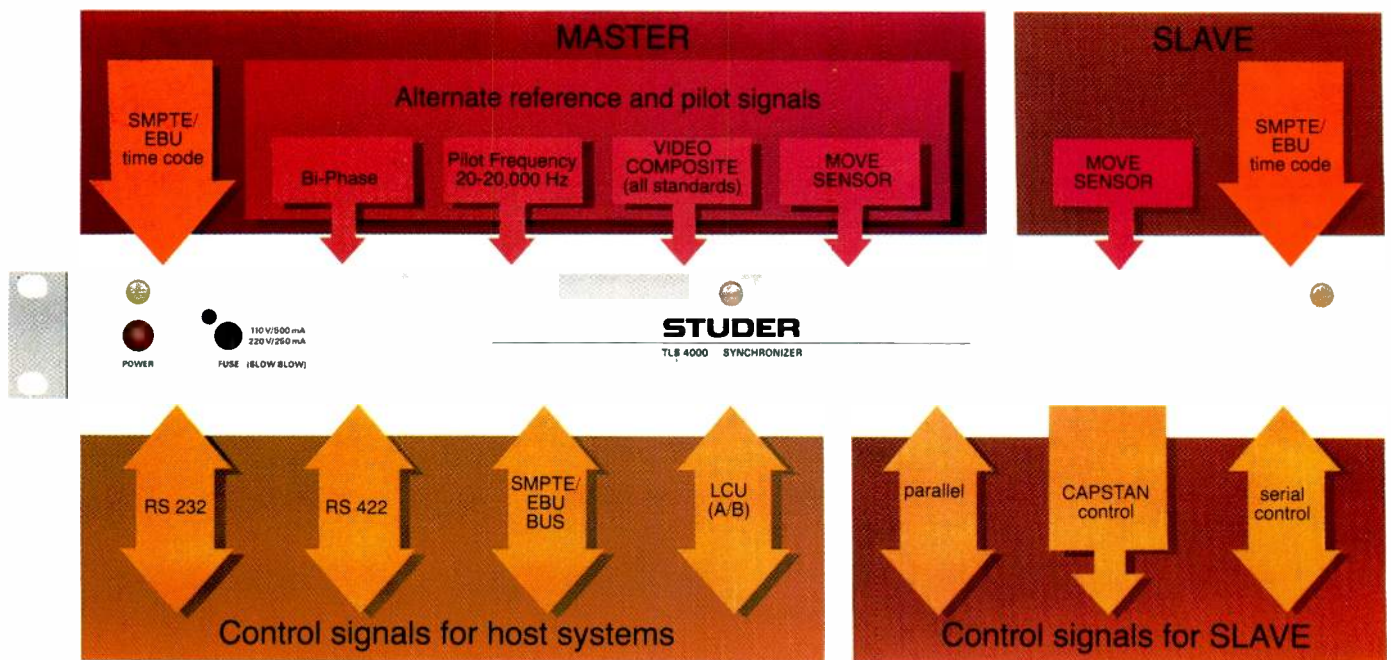
Digital Aims at Audio Carts



PRODUCING THE
ALL STAR GAME

Also in this issue:
**On Location with SNG ■ Setting Up for In-House
Graphics ■ Producing "Live Aid"**

Studer Audio: Production Versatility



Studer's flexible approach to synchronization in audio, video and film production.

The new Studer TLS 4000 synchronizer system offers extraordinary flexibility across a broad range of audio/audio, audio/video and audio/film synchronizing applications. And, thanks to its modular design, the TLS 4000 system can expand along with your growing facility.

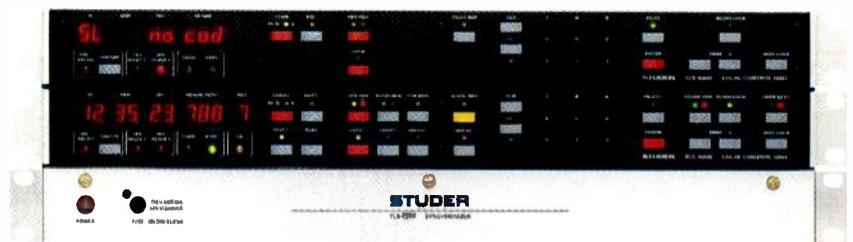
Lock in a Box. The TLS 4000 "black box" unit functions as an extremely accurate chase lock synchronizer for one tape transport. It resolves two SMPTE time codes of any standard, and it will also accept pilot frequencies, video frame pulses, film bi-phase pulses, and move pulses. The RS232/422 serial port links the TLS 4000 synchronizer (in single or multiple units) to centralized controlling and editing systems.

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STUDER REVOX



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



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DOUG GALE, President
Niagara Television, Ltd.

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DOUG GALE, President
Niagara Television, Limited



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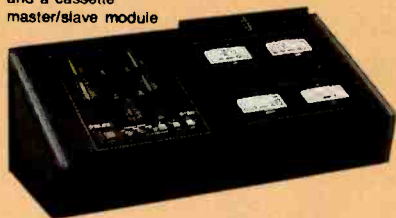
Eventually, because of missed profit opportunities and a frustrating lack of control over

quality, Dameon decided to install his own high speed duplicating equipment. He looked carefully at every product on the market and finally selected the Telex 6120, seven slave, 1/2 track cassette-to-cassette model. He knows that he can add on to his system as his business grows, but for now his 6120 can copy up to 280 C-30s in one hour, and is easily operated by one *non-technical* employee because of its compact size, single button operation, jammed or short tape warning lights and automatic master rewind. Dameon hasn't regretted his decision for one moment because he now has a thriving additional business of duplicating voice and DJ audition tapes, seminars and syndicated radio programs. Now he reports a zero reject rate and his quality image is under *his* control where it belongs.

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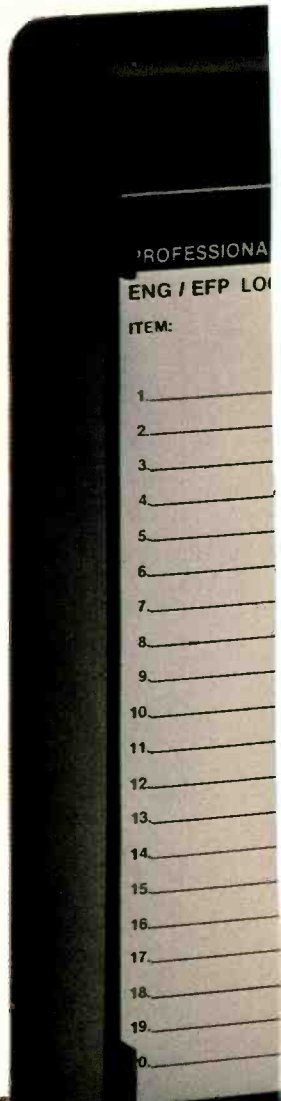
2 ENG Tape Durability—Always Keep The Picture. A tough, dependable binder system withstands the real world demands of heavy ENG editing, so you can still frame and shuttle with confidence.

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BROADCAST MANAGEMENT/ENGINEERING

SEPTEMBER 1985

VOLUME 21/NUMBER 9

FEATURES

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SETTING UP THE IN-HOUSE GRAPHICS STUDIO 61

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SNG: LOCAL COVERAGE ON A NATIONWIDE SCALE 74

The advent of satellite newsgathering (SNG) has made it possible for local news to go live from locations anywhere in the country... by *Robert Rivlin, Editor*

NEW TECHNOLOGY FOR SPORTS PRODUCTION 93

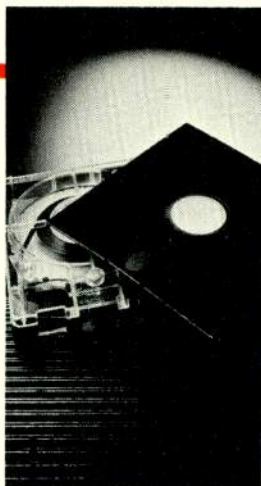
With new techniques for covering sports—everything from moveable overhead cameras to crystal-clear slow motion to image stabilization—local stations and networks alike are discovering innovative ways to excite viewers... by *Judith Gross, Associate Editor*

WE REACHED THE WORLD! 110

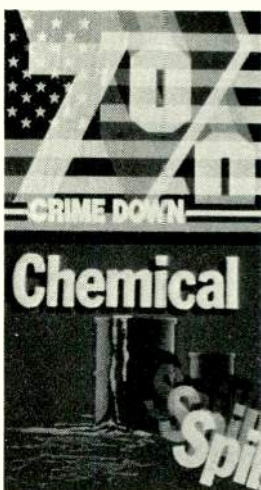
As thousands of music fans crowded into stadiums around the world for the Live Aid concert, the technical community, as much as the rock community, pulled out all the stops.

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NEXT MONTH

SMPTÉ PREVIEW

PROBLEM.

"I need broadcast quality video in the editing studio I'm designing. That means I want a high performance, 3/4-inch digital time base corrector with more than just the basics. I need a TBC that is compatible with Sony 800 series VTRs, has a large window for correction and has outstanding processing capabilities. But I'm on a budget."

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The NAB Responds. . .

The Editorial "AM Appeasement Committee" in the July issue would be timely and appropriate if, as implied, publication of the NAB AM Improvement Report marked the completion of the AM Improvement Committee's work rather than the beginning. In fact, publication of the AM Report began NAB's drive to improve AM quality. Implementation of the report's eight suggestions is, and will continue to be, a high priority here at NAB.

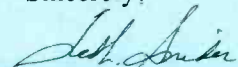
Specifically, we have:

- Completed a \$20,000 technical study of electrical interference to AM reception, to be published in mid August and filed with the FCC.
- Established a technical reference center here at NAB for the use of AM chief engineers, previously unavailable in our industry.
- Created an "AM Receiver Demonstration," with seven state of the art radio receivers, to display the quality capabilities of AM broadcasting.
- Continued to foster and support development of new technology AM antennas. Testing is currently being performed at 27 MHz. If successful, NAB intends to fund construction of a full scale prototype new technology AM antenna.
- Supported in many ways the improvement of AM, e.g., sponsoring four regional AM radio seminars and scheduling an additional directional antenna seminar.

The AM Report did not address AM stereo principally because of antitrust concerns. Even so, the NAB Joint Board of Directors has made AM stereo and general AM improvement an important priority. At its meeting in June, the NAB Joint Board: (1) urged America's AM stations to go AM stereo as soon as possible; (2) authorized NAB to assist stations in promoting the growth of AM stereo; and (3) urged the NAB staff to actively work with radio receiver manufacturers to encourage AM improvement.

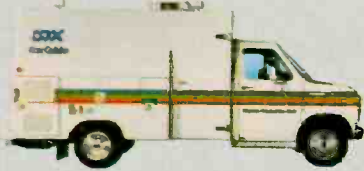
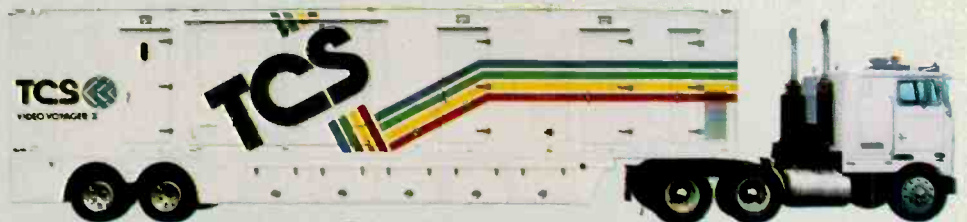
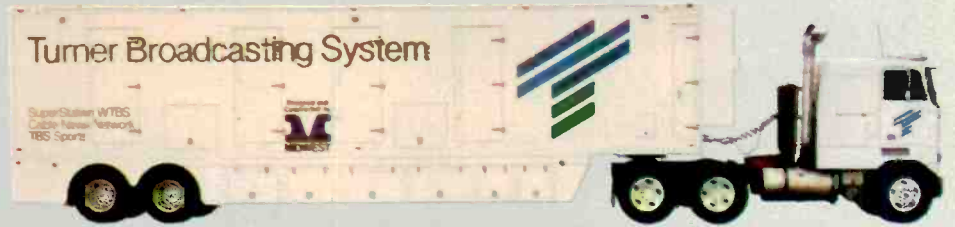
What is most disturbing, however, is your Editorial's clear implication that the NAB technical staff and our committees are concerned more with *appearing* to help AM broadcasters than with actually *solving* problems. As radio broadcasters are aware, nothing could be further from the truth.

Sincerely,



Ted L. Snider
Chairman of the Board, NAB

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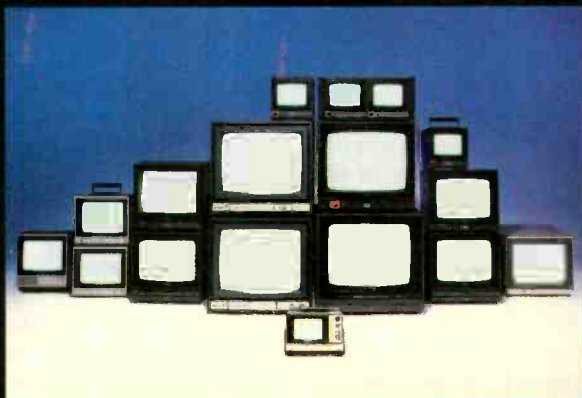


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Video. More and more it's playing a larger role in entertainment, industry, education, even medicine. That's why, no matter what your special application, all you need are the monitors in the Panasonic BT, CT and MT Series.

Our BT Series monitors are the idea for broadcast because they all have the quality and important controls broadcasters require. Like a normal/underscan switch that lets you select either the camera view or the actual monitor picture. Pulse-cross circuits for easy observation of sync detail. And blue only for easy chrominance adjustment. The 13" and 19" BT Series monitors (all screen sizes measured diagonally) have our special CompuFocus™ picture tube. Add to that a switchable comb filter and the result is increased definition and color sharpness.

Perhaps the most versatile of the BT Series are the 7" monitors. There's one that operates on both AC and DC so it's perfect for field use. Another model includes switchable line inputs, external sync terminals and is



available as a single unit or in a dual rack.

Our CT monitors also come in a wide variety of configurations. You can choose from our 19" models. One comes with a tuner, and one can be used internationally because it lets you switch between NTSC, PAL and SECAM. The CT Series 13" and 14" monitors include

models with a built-in tuner, NTSC composite and RGB inputs for use with computer graphics. And when light weight and portability are important, there's the CT Series 5" monitor receiver.

For medical use, the MT-1340G conforms to the UL-544 standard. Its Data Grade in-line picture tube provides the precise resolution medical applications require. While RGB inputs assure you of critically accurate color reproduction.

By now it should be clear, no matter what your special application, the monitors in the BT, CT and MT Series have the right qualifications. Monitor pictures simulated.

For more information, call your nearest Panasonic regional office. Northeast: (201) 348-7620. Midwest: (312) 981-4326. Southeast: (404) 925-6335. Southwest: (214) 257-0763. West: (714) 895-7200. Northwest: (206) 251-5209.

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ABC Backs Indesys, New FM SCA Venture

A new nationwide data and message transmission system using FM SCA is due to roll out next month at stations—mostly ABC O&Os—in half a dozen major cities. The new joint venture, named Indesys, Inc., is being backed in part by ABC Video Enterprises and may add several more major markets early next year, depending on demand.

The addressable delivery system will distribute data to FM stations via an ABC C-band satellite transponder. Stations will install an IBM AT to handle the data, which will then be broadcast on the FM subcarrier by a transmitter developed by Indesys. At the final destinations, FM sideband receivers will be wired directly into personal computers and smart printers along with an FM antenna, high-gain if needed. Messages, which are addressed and scrambled, can originate from any PC via a modem.

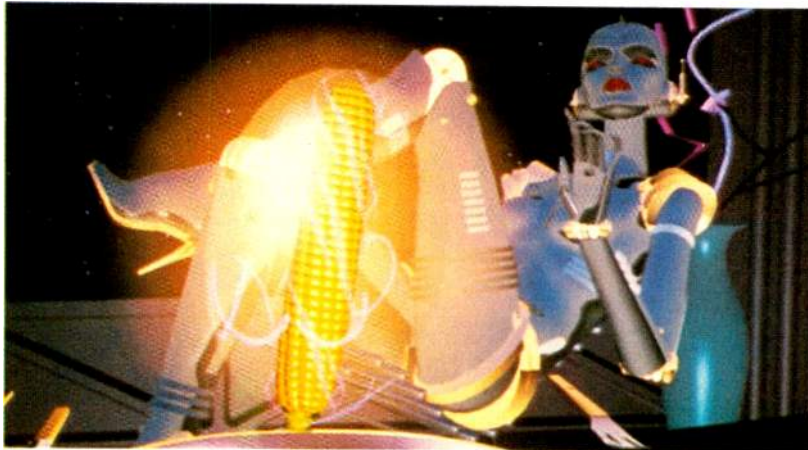
Both satellite and FM transmissions will run at 38.4K baud, allowing Indesys to promise delivery of its highest-priced tier (20 cents per page) in as little as one hour, even during peak business periods.

WPLJ-FM in New York city, KLOS-FM in Los Angeles, WLS-FM in Chicago, and KTKS-FM in Dallas, all ABC O&Os, are scheduled to handle Indesys' launch along with KOME-FM in San Jose, which is part of the Infinity Broadcasting group.

Last Call for Best Station and Facility Design Com- petition Nominations

It's not too late to nominate your station or teleproduction facility for *BM/E's* annual Best Station and Facility Design Competition, the industry's showcase for recently built or renovated installations. If you're proud of the planning and care that went into designing your station or facility and would like to put it in the running for the Competition, call us at (212) 685-5320, and we'll

SIGGRAPH Draws Crowd in San Francisco



"Sexy Robot" is a frame from a computer-generated TV commercial for the American Can Council that aired during last year's Superbowl and was this year's "hit image" at SIGGRAPH. Created by Abel Image Research, an affiliate of Robert Abel & Associates, the robot asks the question "what's for dinner?" and receives the answer that, even in the year 2000, it will still come in cans.

Despite the bad times being faced by the rest of the computer industry, computer graphics is stronger than ever. This year's SIGGRAPH show (the Special Interest Group on Graphics of ACM, Association for Computing Machinery) drew over 27,000 exhibitors and paid attendees to San Francisco in late July.

Video graphics continues to be a small but increasingly important part of this industry, with several TV equipment manufacturers finding a lucrative slot in the computer graphics market. Significant new product introductions were made, for instance, by Artronics/3M, following up on the success of the BFA and MFA paint programs. Artronics will

now manufacture and 3M will market a new combination paint, digital effects, character generator, electronic frame store, and real-time animation system priced at \$69,995.

Bosch, too, announced a new paint system that will be formally introduced at NAB. Graphics features will include enhanced cut-and-paste and stenciling and user-definable brushes, with a 16.8-million color palette.

Monitor manufacturers also made their presence felt, especially Conrac, which is mounting a major new marketing effort on behalf of its NTSC and high-resolution monitor lines. We're reminded that they are made in America.

rush an application package to you. Entries are featured in *BM/E's* December issue, and readers will vote on what they think are the best of nominated stations and facilities.

Cable Deregulation— Must-Carry Out

In a landmark decision, a U.S. Appeals Court has declared the FCC's cable must-carry regulations unconstitutional. Smaller independent and public

television stations are seen as the broadcasters most likely to be affected.

The NCTA and cable operators have hailed the decision as a major victory, while the NAB and INTV deplored it as an attack on localism in broadcasting. The NAB suggested that Congress should look into cable's "preferential copyright status—the right to rebroadcast programs for a fraction of their marketplace price."

Analysts generally predict the decision will have little effect on programming at newer cable operators which

NEWS

have large channel capacity, but ops with fewer channels are expected to drop less popular independent and public stations for extra cable offerings.

The court's decision was largely based on must-carry's violations of the First Amendment, especially the rules' lack of consideration that a cable operator has to carry all local stations without discriminating as to their local programming value. The court said that the FCC rules "indiscriminately protect each and every broadcaster regardless of the quantity of local service available

in the community and irrespective of the number of local outlets already carried by the cable operator." The court also found that some cable ops were prevented from carrying programming viewers might prefer and that the Commission had never made any economic studies in the 20 years since it had ruled local programming would suffer without must-carry.

The court went on to say that the FCC could rewrite new must-carry rules if they are more sensitive to the First Amendment.

The Appeals court made its decision in response to separate requests from Quincy Cable TV, a Washington state cable operator and Turner Broadcasting.

FCC May Divert More UHF Spectrum for PLMS

The FCC has proposed turning over more UHF channels in eight of the largest U.S. cities for private land mobile radio, along with allowing "flexible spectrum usage" for channels 50 to 59. A joint government/industry advisory committee is also being set up to consider questions about the sharing and about interference problems.

The eight areas affected are New York, channels 19, 27/33, 34/28, Los Angeles/San Diego, 26/32 or 32/36, 48/42, 60/66, Chicago, 41/47, 64/68, San Francisco, 18, 24/28 or 34/28, Philadelphia, 26/32, 42/46, Baltimore/DC 36/30, 39/35, Houston, 16, 41/35 or 63/69, and Dallas 17, 41/35 or 66/62.

Existing full service stations would be protected, but applications for new stations would have to live with any interference resulting from the new rules.

LPTV would be especially hard hit by the proposed spectrum allocation shifts. In cases where an LPTV application conflicts with land mobile operations, if a minor change can prevent interference, an amended CP will be granted, but if not, the application will be dismissed. In a separate statement, commissioner James Quello said that the sharing proposal could "completely preclude" LPTV in a few big cities and that the Commission should try and make an "informed decision."

Concerning interference, which is already a problem in many cities, Quello promised that he would keep careful watch over the advisory committee's technical analyses.

Digital Seen for Most Recording Studios

Digital sound recording, which is now installed in less than five percent of professional recording studios, will expand to 80 percent of studios in the next eight years, predicts an Ampex Corp. executive.

According to Ed Engberg, audio marketing manager for Ampex Corp.'s

To create the world's best 14x9 Video Lens, we had to innovate, design new and better optics, build a better housing. And we did!

This lens clearly outperforms everything in its category. With an aperture of 1.6, it's the fastest 14X lens made. Superior optics, superior design, superior mechanical construction. The center of gravity has been positioned closer to the cameraman to substantially reduce torque and the weight factor. It feels significantly lighter. We know the abuse ENG/EPF lenses take, so we did away with the internal pins which often become damaged causing zooming bumps and jumps. We replaced the pins with super strong rods and grooves so this won't happen, even under constant rugged use.

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But we haven't been standing still when it comes to this system. Now, the A42 offers a new library system with alphanumeric search capability, so you can find what you need even faster.

The A42 system offers an advanced combination of 5¼" Winchester disk drive and full bandwidth video processing. A42 features include: on-line image storage expandable to 1050 frames/2100 fields, adaptive digital signal processing, superb multi-generation capability for graphics composition, off-line storage on ¼" digital tape cartridge, and single- or dual-channel configuration.

If you want a powerful digital still store system at your

fingertips, take hold of our feature-packed Abekas A42. For details contact: Abekas Video Systems, Inc., 353A Vintage Park Drive, Foster City, CA 94404. (415) 571-1711.



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Magnetic Tape Division, "digital will become a fact of everyday life" at most studios. Engberg says that about 650 digital recording systems will be installed by the end of this year but that by 1993, digital multitrack systems will grow to about 2000 units and two- and four-track units will multiply to 5000 units.

Ampex, a major manufacturer of digital and analog mastering tape, expects analog multitrack recorders to decline from 4000 units at this year's end

to 1000 in 1993, and two- and four-track systems to decrease in number from over 8000 to about 2000 in the same period.

As to why this changeover will take place, Engberg cites growing studio confidence in digital's "reliability" and CDs' rapid growth in the consumer market. However, analog equipment will remain a vital market, he says, since it will always be less expensive and will be sufficient for many studio applications.

**RTNDA Announces
1985 Radio and TV
Awards**

The Radio-Television News Directors Association has identified the stations which are this year's winners of its national awards. The recipients will be honored at this month's RTNDA convention in Nashville at a banquet hosted by Dan Rather (see schedule on page 44 of this issue.) Separately, the association has reported good news for broadcast coverage of the courts in several states.

In radio, WDBO, an all-news station in Orlando, won the Edward R. Murrow award for outstanding overall radio news operations. Lee Hall is news director.

KFMB, San Diego, Cliff Albert news director, won the radio Spot News award for its coverage of the McDonald's shooting in San Ysidro.

KMOX, St. Louis, John Angelides, news director, took the Continuing Coverage award for its year-long work on health care.

In television, the Murrow award went to WCVB-TV, Boston, Phil Balboni news director. The judges cited "well-conceived and thorough" reporting and state of the art production values.

WNEC-TV Norfolk, VA, David Goldberg news director, won the Spot News award for coverage of a tank truck explosion.

WRAL-TV, Raleigh, NC took the television Continuing Coverage award for its work on Hurricane Diana (see *BM/E*, November 1984 News section). Ron Price is news director.

The Investigative Reporting award for television went to WCCO-TV, Minneapolis, Reid Johnson news director, for a report on HMOs. No award was presented for radio Investigative Reporting this year.

Separately, an RTNDA status report shows that courtroom coverage is becoming a distinct possibility if not reality for broadcasters in several states. Although the U.S. Supreme Court denied CNN's petition to cover the Westmoreland trial, a report by the state of Kansas has concluded that that state's experiment in radio and television coverage had not been "distracting or disruptive," and the experiment has been enlarged and extended

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320.

The ProCam™ Video Camera
with Plumbicon® tubes at Saitcon** price.

JVC's experience — and success — in designing the highest quality and reliability into compact video production cameras is unmatched. Now, continuing this tradition of high performance at an affordable price, JVC has brought a "high-end" teleproduction camera within the financial reach of production people often victimized by modest budgets. This time, it's ProCam 320.

What a package!

SENSITIVITY. ProCam 320 features three, 2/3" Plumbicon pick-up tubes for incomparable picture quality. A refined f/1.4 prism optics system provides horizontal resolution of better than 600 lines at center. A 2H vertical contour correction circuit further assures image clarity. And minimum illumination measures only 38 lux (3.6 fc) at f/1.7, permitting shooting even in limited or artificial light.

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Several 8-bit data memory chips offer operator conveniences for quick set-up and consistent performance. These include: Auto centering, auto-black balance and auto-white balance, auto black level stabilization and auto beam control circuits. Matrix masking for true color reproduction and automatic protection for the pick-up tubes are a few of the many features standard on this new camera.

VERSATILITY. Easy portability. Outstanding performance in low-level



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For a demonstration of the ProCam 320 Video Camera, a 320 Spec Sheet, or JVC's complete catalog, call, toll-free:

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through this year.

In Louisiana, the state Supreme Court has made all media coverage of appellate courts permanent. The Pennsylvania Bar Association has recommended extended media coverage of all courts for one year as an experiment, and in New York state, the Assembly has been presented with a bill proposing 18 month experimental coverage of trial and appellate proceedings.

FMer Provides Dialup Weather Information

You're rushing to get ready for work. The radio has just started playing a favorite song of yours, which is great except that you missed the weather report five minutes ago when you ran back into the bathroom and now it's almost time to go. It looks overcast but maybe it'll clear up. . .

Instead of spinning the dial, many

residents of Seattle, WA deal with this situation by calling the radio station. KSEA-FM is using a telephone answering system called Weatherphone to deliver weather information, a station ID, and commercials to over 100,000 callers a month. The station is reportedly averaging about 3300 calls a day, with 1.2 million calls logged in 1984.

Advertisers have been taking advantage of the service by purchasing a sponsorship package that includes a message during the call, air time, and promotions for the number such as bus ads and billboards.

The digital recorder/announcer, put out by Audichron of Atlanta, GA, can relay messages of up to four minutes. Audichron provides meteorologists around-the-clock for stations that do not want to do the weather segment themselves. Besides weather, the company hopes to interest stations in using its system for community services.

Television News Doing its Job, Roper Study Shows

According to the American viewing public, local stations are doing an outstanding job of covering everything from major events going on in the area (fires, accidents, etc.) to local government, politics, weather, crime, and police activities and to several other categories of coverage on which local stations have traditionally prided themselves. The poll of nationwide viewers was recently completed by the Roper Organization for the NAB's Television Information Office.

Other findings in the same study indicate that:

- Television is by far the most trusted medium, considered the most believable source of information by over twice the number of people who prefer newspapers, and seven or eight times the number who prefer radio or magazines.

- Sixty-four percent of the respondents said they use television as a source of information about what's going on in the world—compared with 40 percent who mentioned newspapers and 14 percent who mentioned radio. This confirms the trend over the past several years towards the increasing use of television as a source of news and information.

"FOR THE GENERAL BROADCASTER THERE'S NO CHOICE. THE AN-2 STEREO SIMULATOR IS COMPLETELY MONO COMPATIBLE, SOUNDS GREAT AND IS PRICED RIGHT"

*Jim Swick
Assistant Chief Engineer
Maintenance and Design
WTTW Chicago*

"We were the very first TV station to broadcast full-time in stereo and Studio Technologies' Stereo Simulator was with us from the start. As we began experimenting with on-air stereo I was told about the unit. Being an old radio type I was skeptical . . . make stereo out of a mono signal? Sure. But when I plugged it in I was surprised. It gives you really nice room ambience and sounds great. We've been using it ever since. What's terrific about the AN-2 is that it is fully mono compatible—absolutely

no artifact left when you mix the two channels back together.

We use another AN-2 in our audio studio for 'stereoizing' movie clips for our Sneak Previews series . . . it's excellent for that.

We get a lot of feedback from our 'golden ears' listeners and all comments have been positive about our stereo sound . . . they really like it!"

For more information on the AN-2 call Studio Technologies, Inc. at 312/676-9177.



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NEWS

• TV news as a whole is doing an excellent job. Asked to rate television's coverage, viewers responded as follows:

	Excellent, Good %	Not very good, poor %	DK/ NA %
Major national events (flood, inauguration, etc.)	94	4	2
Major sports events	94	2	4
National news	92	6	2

Major international events	88	9	3
Local news	84	14	2
Economic news	76	20	4
General overseas news	75	22	3
Business news	67	26	7

The results of another Roper poll on TV news, published in the May 13 edition of *U.S. News and World Report*, shows that despite the balyhoo over

"left-leaning" network news organizations being raised by right-wing extremist groups such as Fairness in Media, the majority of viewers think that TV news is neutral in its coverage of political and social events. And so while 10 percent of viewers think that the news favors conservatives and leans to the right, and 23 percent thinks it favors liberals and those to the left, 58 percent think it is doing a fair job.

The same study showed that, of the three network nightly newscasts, *ABC World News Tonight* is considered most fair and balanced, *CBS Evening News* slightly less fair, and *NBC Nightly News* the least fair of the three—although all three scored exceptionally high in viewer rankings.

More Stations Join MTS Ranks

Seattle can boast that it's the first market to have all three network affiliates broadcasting stereo sound, with the addition of NBC affiliate KING-TV. CBS affiliate KIRO and ABC affiliate KOMO had previously begun multichannel audio transmission.

In Sacramento, KXTV, a CBS affiliate, has also gone stereo. In Burbank, NBC O&O KNBC has also switched to multichannel sound just in time for the NBC network broadcast of the All Star baseball game, in full stereo.

On the east coast, PBS station WGBH has also been broadcasting multichannel sound.

WGBH and KING are using Modulation Sciences stereo generating equipment, while KXTV has an Orban Optimod stereo generator and Orban stereo synthesizer. KNBC has a Modulation Sciences stereo generator and also a Kintek stereo synthesizer for programs that are not recorded in stereo.

Europeans Debate HDTV, MAC, Digital at Montreux Conference

Whether or not broadcasters eventually adopt a worldwide standard for HDTV transmission, HDTV production is likely to push forward anyway. This was made clear when, midway into the Montreux TV Symposium in Switzerland in early June, Sony Broadcast completed the sale of its first high-definition video system (HDVS) to David Niles of Voir Studio 57 in Paris.

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- Optional 5-frequency EQ with Pan Pot on any mixer position. Pan Pot optional on standard mixer.

- Muting and equipment start relays are standard.
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System 12-SERIES IV is \$9950.00 with 8 mixers. Price, as shown, is \$12,150.00. Please call for a color brochure and more information on this splendid new line of audio consoles. We'll deliver in just 2-4 weeks!

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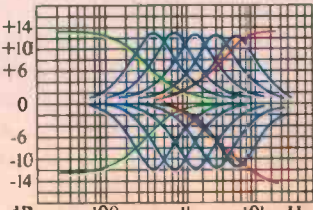


Studio quality is no longer confined to the studio.

12 FOR THE ROAD.

The big difference between the Sony MX-P61 and other studio-quality 12-channel mixers is that the Sony can be tucked neatly into a small case and carried to any location—thanks to its switching power supply, transformerless design and, of course, the fact that it's made by the company that's best at making big things small.

Its myriad professional features include transformerless, electronically-balanced inputs and outputs, complete equali-



EQ characteristics of the MX-P61.

zation for comprehensive signal control and modular construction for reliability and easy maintenance. Along with the phenomenal sonic performance with which the name "Sony" has been synonymous for decades.

THE 4-CHANNEL MIXER

FOR EVERY CORNER OF THE GLOBE.

The incredibly small and light MX-P42 lessens not only your burden, but the complexities of field recording as well.

That's because each input incorporates a fast-acting compressor/expander with gain make-up control. So input levels can be preset separately, then maintained automatically during recording.

HIGH QUALITY FOR LOW BUDGETS.

The family resemblance between the 8-channel MX-P21 and

Sony's more expensive portable mixers is readily apparent:

The MX-P21 is portable, durable, and has an incredible array of features for its size—including phono EQ, fader-start and cascade interface.



The Sony MX-P42 weighs in at a scant 8 lbs., 10 oz.

All of which makes the choice between Sony and any other portable mixer a simple one.

Just decide whether you want all your location recordings to be as good as studio recordings.

Or not to be.

For a demonstration or more information, call Sony in the North at (201) 368-5000; in the South (615) 537-4300; Central (312) 773-6000; West (213) 537-4300. Or write Sony Professional Audio Products, Sony Dr., Park Ridge, New Jersey 07656.

SONY
Professional Audio

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The order comprises three VTRs and one camera with monitor and accessories, but neither party would reveal the exact price, which was thought to be somewhere under \$1 million.

Meanwhile, the EBU-ATSC Liason group has reaffirmed its commitment to establishing a worldwide HDTV standard—although at its fourth meeting the group acknowledged that two issues have to be resolved before acceptance of the 60 Hz field rate grows. One issue is the quality and economics of

standards conversion to terrestrial and DBS 625/50 systems. The second issue is the long-term implication of broadcasting HDTV in 625/50 areas.

HDTV received considerable attention in other quarters at Montreux as well. Grass Valley Group introduced its experimental HDTV (1125/60) production switcher to demonstrate the feasibility of applying sophisticated mixing and special effects techniques to an HDTV application. The experimental switcher is a three-channel unit

operating in RGB mode.

Another significant addition was the demonstration of a Quantel high-definition Paintbox. The pictures were particularly effective when projected on a 120-inch screen.

The Montreux Symposium also served as a platform for demonstrating the results of the world's first all-digital television production studio, under construction in Rennes, France.

The primary manufacturer for the Rennes studio is Thomson-CSF, whose Equipment Division was charged with designing and building the necessary hardware, incorporating three Bosch experimental digital VTRs introduced through a CMX 340XL editor.

The heart of the all-digital studio is a new switcher (TTV-5650) specially developed by Thomson. The switcher and its associated mixer has 16 serial inputs and outputs conforming to SMPTE/EBU interface standards.

Montreux also generated heated discussion on MAC. Spurred by the coming of a new DBS transmission system, European engineers are of one mind: replace PAL and SECAM with a better quality single standard. The answer is the already proposed MAC (multiplexed analog component) signal format, wherein the separate luminance and color difference signals are transmitted in time sequence without encoding.

But a prevailing controversy still saw some heated debate at Montreux, centering around B-MAC, C-MAC, D-MAC and D-2 MAC. Originally endorsed by the EBU, the IBA's proposed C-MAC system was accepted by the CCIR as a standard system for DBS.

Then came B-MAC, proposed by Scientific-Atlanta and D-MAC, or D-2 MAC, as proposed by the European Association of Consumer Electronics Manufacturers. D-2 MAC restricts the number of sound/data channels in order to make it easier to carry MAC-type signals over terrestrial networks such as cable TV and microwave. In April, the EBU modified its recommendations to specify D-2 MAC Packet as the standard for DBS transmission.

But the IBA for one does not support D-2 MAC or B-MAC. Only C-MAC or D-MAC offer the opportunities for later upgrading to provide a compatible wide-screen, high-definition television service, according to the IBA. So, the battle rages on.

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Sophisticated technology combined with ease of operation is making the Elecon editing system the first choice among professionals worldwide. In fact, more Elecon units are used by the high-end Japanese post-production market than all other brands combined. Experience the difference that Elecon can make in your operation.

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To accomplish a comprehensive audio proof with other test equipment can take as much as 4 hours. In less than sixty seconds our system will deliver the same precise data.

Just want to check a distortion spec? How about 500 msec? Level? Would you believe 30 msec?

The SuperSeries lets you design your own test routines and store them in programmable, non-volatile memories. Why go through time-consuming, tedious and superfluous external computers or controller programming if you don't have to? In fact, forget flipping floppys entirely!

The Generator outputs sine and square-waves, SMPTE IMD, Tone-Burst and Sine-Step. Output level is +30 to -90 dBm. RF is completely eliminated by fiber-optic signal isolation.

The Analyzer can make more measurements than any other test system presently available: flat & filtered level, S/N, THD vs. Level & Freq., SMPTE IMD, phase error, channel separation - even Quantization noise. Naturally, both units are electronically balanced and floating.

FSK SUPER COMMUNICATIONS

In addition to GPIB and RS-232 interfaces, the SuperSeries can talk to each other easily because of our exclusive FSK communications protocol. This means you can perform any kind of automated test, in any sequence, in any application, without the need for an external computer, controller or separate communications line.

The 3000 SuperSeries are available as separates (pictured) or together in a single mainframe. Options are limited, and there's a 2000 Series for less demanding, but equally important test requirements.

Contact us now for full technical data and prices which will undoubtedly be more good news.

Here on the Daily Planet, and in a world of injustice, your biggest crime would be to ignore the facts from the mild-mannered company.

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The National Weather Service is now fully operational with a series of radar transmitters called RRWDS: it's their primary precipitation detection tool. The Alden C2000R is the color radar display system which allows its subscribers to access any of these RRWDS transmitters, on a direct line or dial-up basis.

2. What if I only want three or four sites?

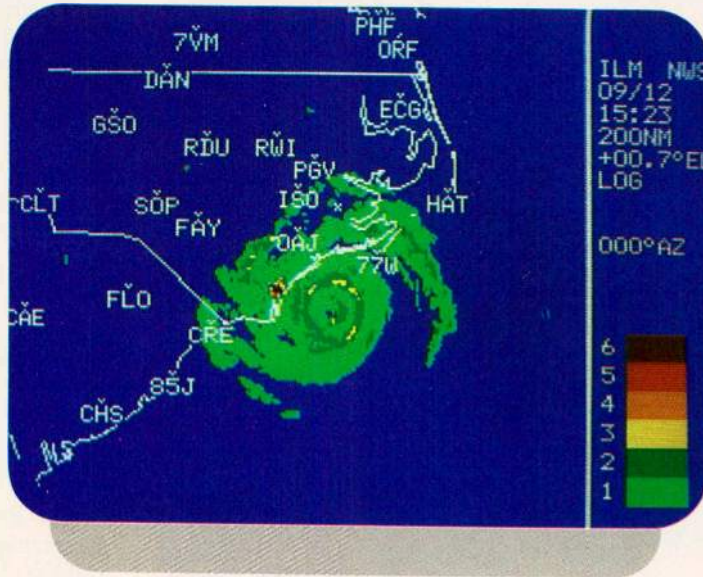
With the Alden system, there's no need to pay for access to the whole country if you only need data from a few radars. You specify the sites you want, and we program your auto-dialer phone to receive these sites. You pay only for the sites you need.

3. Will I get busy signals?

Probably not. The system is designed so multiple users can call simultaneously. And because we know who has access to each radar, we can expand the system as subscribers increase.

4. What about service?

Of course the transmitters are maintained by on-site government technicians. And for Alden equipment, we maintain a nationwide



service network for reliable operation.

5. What features are included?

The Alden C2000R has a number of built-in features that are costly options in other radar display systems. Zoom, range rings, sweep line, NTSC/RGB

compatibility, time lapse and level flashing are included in the standard C2000R. And there's no hookup charge to connect to any radar.

6. Are there options?

You can add additional memory, clutter blanker, alarm, customized backgrounds—even a high-resolution printer for color print or transparency. And for a surprisingly small additional cost, you can convert the C2000R

to the C2000R/S, which lets you receive color weather graphics from private data bases.

7. Can we afford it?

The Alden C2000R is far less expensive than other similarly equipped radar display systems. If you don't need all the features of the C2000R, the cost is even less for our C2000M radar monitoring system. If you've looked at weather display systems in the past, you will be pleasantly surprised at the cost, lease or purchase, of an Alden system.

8. How do I find out more?

Just fill in the coupon, or call Alden, and we'll be happy to set up a demonstration.

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Title _____

Company _____

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City _____ State _____ Zip _____

Our C2000R/S adds weather graphics from private data bases, such as these from Accu-Weather® and WSI SUPSAT™



ALDENELECTRONICS

NEWS BRIEFS

The FCC has adopted new rules protecting **channel 6** television stations from noncommercial educational FM stations using channels 201-220. NCE-FMers must adjust their facilities to limit predicted interference according to procedures based on specific situations.

Additional **AM technical rule changes** have been proposed by the FCC to permit higher power for class IV stations outside the continental U.S., merge class III-A and B stations into a single class III category, and authorize synchronous AM transmitter systems.

Radio stations no longer have to file their **network affiliation contracts** with the FCC though television stations still must file. The Commission said its action will save on paperwork. . . . The NAB has asked the FCC to strengthen **AM daytimers' preference** in 80-90 assignments. It also requested that the divestiture requirement be eased and for very small markets, eliminated.

The Canadian Association of Broadcasters has protested the **CRTC's**

broadcast fee increase, which, it says, would allow many more cable systems to pay the minimum \$25 fee. Public broadcasters, who can advertise but pay no fees currently, should also share the fee burden, the CAB believes. . . . The All-Industry Music Licensing Committee has reached an agreement with **BMI** to make its fees equal to ASCAP's, which are currently being negotiated in court.

On the **stereo television** front, **WNOL-TV**, an independent, says it is now New Orleans' first commercial stereo station; the new service was introduced with the Live-Aid concert. . . . **KRON-TV** of San Francisco has gone stereo. . . . **KWCH-TV** in Wichita has rewired itself and begun producing its news in stereo and synthesizing other programming.

The NAB has told the FCC that **television commercial verification** systems using VBI coding should require the approval of each station licensee. Permission to use line 22 should also require that the visible picture is not interfered with or degraded, the association added. Two companies have asked

the Commission to approve their systems for monitoring commercials (see *BM/E*, September 1984, News section).

Winners of the **National Federation of Community Broadcasters'** Golden Reel award are Joe Cuomo of WBAI-FM, New York City, Samuel Orozco of KSJV-FM/Radio Bilingue in Fresno, the Center for Puerto Rican Studies of Hunter College, also in New York City, Barbara Bernstein of KBOO-FM, Portland, and Independent Producers In Sound with WBAI-FM.

NATPE's second production conference will be held next year in St. Louis on June 19-22. . . . The Atlanta **Computer Graphics** show scheduled for October has been cancelled due to the industry slowdown.

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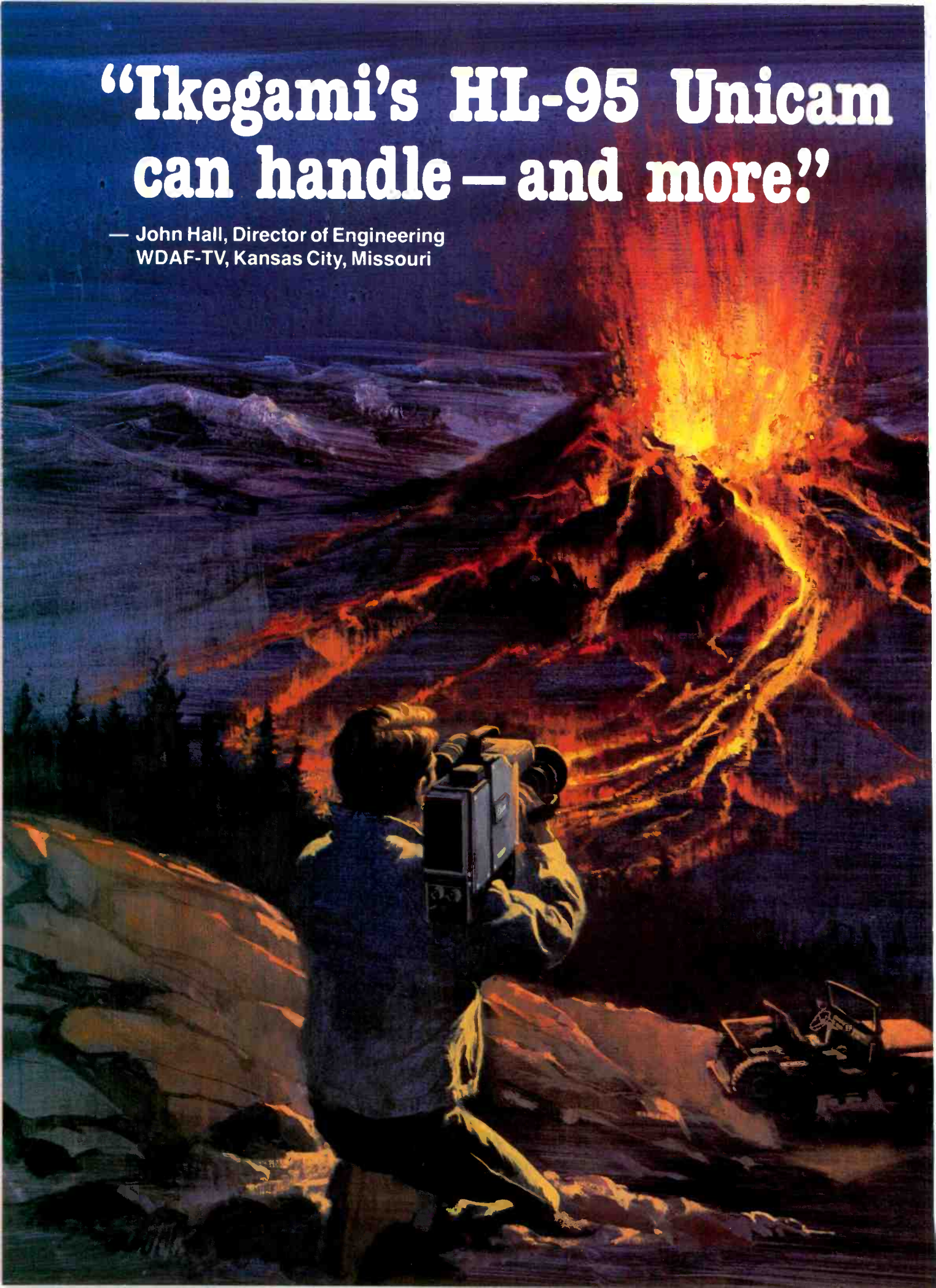
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RADIO programming & production

WABB Goes Fishing With New Remote System

By Douglas Damoth
Assistant Editor

The biggest sporting event of the year on the Gulf Coast is not a New Orleans Saints game but the Alabama Deep Sea Fishing Rodeo, a 53-year-old fishing contest that this year netted over 2000 participants and 180,000 pounds of fish. And, as it has been for 22 years, WABB AM and FM was on hand with some gear and techniques of its own to cover the event.

A key element in coverage this year was a brand-new remote system being tried out by the station for the first time. In years past, the station had relied on a combination of two-way radio and phone lines, that, as chief engineer Tim Camp says succinctly, "was always a pain. That system was okay back in the heyday of AM, but it doesn't sound good on 100,000 watt FM. It was almost bad enough, to my ears at least, to be a tune-out."

In addition, there were always signal problems, especially with the coastline RF. And sometimes reports were missed due to problems as simple as a busy phone line back at the station.

Another fundamental problem in getting clean sound for remotes in that area is distance. Radio stations around Mobile have to contend with an oblong coverage area stretching across three states from Biloxi to Pensacola. WABB's listeners, for example, are spread up and down about 75 miles of coast; Dauphin Island, where the Fishing Rodeo is based, is 35 miles from the transmitter.

New RF system

This year as usual, Camp reports, the distance was wreaking havoc with many stations' efforts to reach antennas that are typically sited on top of their studios. WABB, however, had better luck. During the past year management decided to spring for its first big remote system, and it bought a Marti repeater



WABB never had to use the backup studio and telco installed on its boat; instead, it broke-in the new Marti RPU system installed in its van (lower right). The live remote had line of sight over 35 miles to WABB's transmitter.

package, including a portable RPT2 2 W UHF remote unit that is picked up by the station's van and relayed by a RPT40 40 W VHF transmitter with a 3 dB gain whip antenna on the roof.

For power in the truck, since it's parked unattended for long periods, a 500 W, 12 V gasoline-powered generator was installed under the hood.

WABB's van, in turn, had line-of-sight to its DB Products antenna, even though it's located 15 miles on the other side of the station's studio. The VHF antenna is mounted 600 feet up on a 1000-foot tower that is on a hill 225 feet above sea level. Thus, for this event, the antenna was 800 feet high. Camp adds that not everyone can put in this kind of setup. Indeed, WABB has to use tuned cavities in front of the feed line on its receiver to get rid of RF from a taxi company 60 miles away.

Another station in the Mobile area has similar remote equipment, Camp notes, but its VHF antenna, under the FM antenna, is only 250 feet high, so it has been discussing multiple receiver sites.

From WABB's transmitter site, the feeds are sent to the studio via subcarrier and run through a graphic equalizer and compressor before going to the custom-built on-air console. A

separate two-way UHF system allows the home-base DJ to talk back to the remote site—WABB likes its remotes very conversational.

The result is an on-air signal beyond anything the station was used to. Camp says that on the first day of the rodeo, WABB's owner, back at the station, asked "Are you sure John (Bowler, the operations manager) is at Dauphin Island? It sounds like he's in the studio."

Live interviews

But Bowler was out, roaming around the weighing-in area gathering interviews with fishermen, the Jaycees (who organize the event), and people on the scene. The 2 W battery-powered Marti transmitter allowed him to do live interviews anywhere within about five blocks of the van, and he made a big impression, Camp says, telling people they were going to be live on WABB.

As in years past, the station also set up a studio on its 55-foot Seacruiser anchored near the weighing station, with a phone line back to the station. This year it was simply a backup for the RPU system, however, although it did serve a promotional need—decorated with banners and with a hot air balloon up above. Bowler conducted some inter-

RADIO PROGRAMMING

views on board. But from an engineering standpoint, the remote setup reduced the boat to a battery recharging station and refuge during the first morning's rain.

Besides Bowler, other WABB on-air talent also provided reports, including Bill Evans, the station's meteorologist, who gave tips on what the weather might do and its effects on the fishing, along with sports director Ron Gollnick and news director Ron Reams. The three put a lot of their material on a small cassette recorder and then fed it through the control panel in the van. Essentially, the repeat station acted as a mini studio, Camp observes; the transmitter has a built-in compressor, and the mic jack and line input each have their own gain control, so tape could be cued, held on pause, and then aired live-on-tape. A crystal on a spare channel of the auxiliary UHF system allows the person in the van to listen in on the RPT2 for cues.

"It was a piece of cake," Camp says. "We were even doing another remote simultaneously—a Burger King opening; we just timed the breaks." Rodeo reports fell 10 minutes before

the hour. In three days the station ran 30 rodeo reports on AM (oldies) and 14 on FM (CHR), with ads linked in.

Community involvement

In purchasing the Marti system, station management had decided on doing a lot of remotes and doing them right. WABB has incorporated lots of short, remote activity as part of its formats and as a salient feature of its heavy commitment to the local community. The station recently recaptured the number one ratings spot, in part, it believes, by getting into the community as much as possible. Camp and the management do not want to sacrifice sound quality, however; they want the remotes, like the studio shows, slickly done.

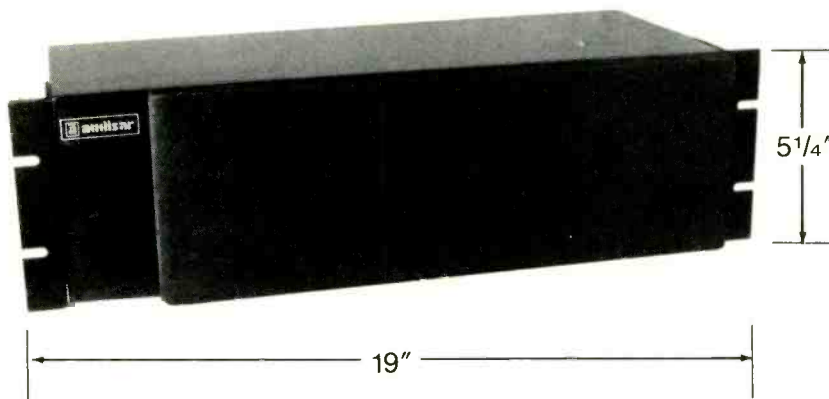
Not every station can justify the layout necessary to put this kind of operation together. Camp estimates that the new setup cost \$10,000-\$11,000. "But it was the best investment we ever made," he states flatly. One big reason is telephone rates. "Phone companies act as though feed loops are made of gold," Camp says with some emotion.

The new Marti equipment will also free the chief engineer from working on remotes while allowing WABB to do basically all the on-location work it wants. Instead of all day setups involving masts and yagis and stringing long mic cords into stores, Camp says he will now be able to just hand the van keys to a DJ, who will drive to the location, lock up the truck and walk around alone with the portable unit. Without this equipment, Camp says, he would need another person just to handle the large number of remotes planned.

"Besides, jocks like freedom," Camp observes. "They don't want to be tied down—especially two of our DJs who do many of their shows from all over town. Just a month before the fishing competition they did a four-hour show underwater, in a shopping mall." Camp put small condenser mics inside full face masks, and people could listen to or watch the talent live and on-air in the skin diving tank.

Chief engineers, too, have been known to enjoy more freedom. Camp, for example, actually had time at this year's rodeo to put his feet up and enjoy the show. **BM/E**

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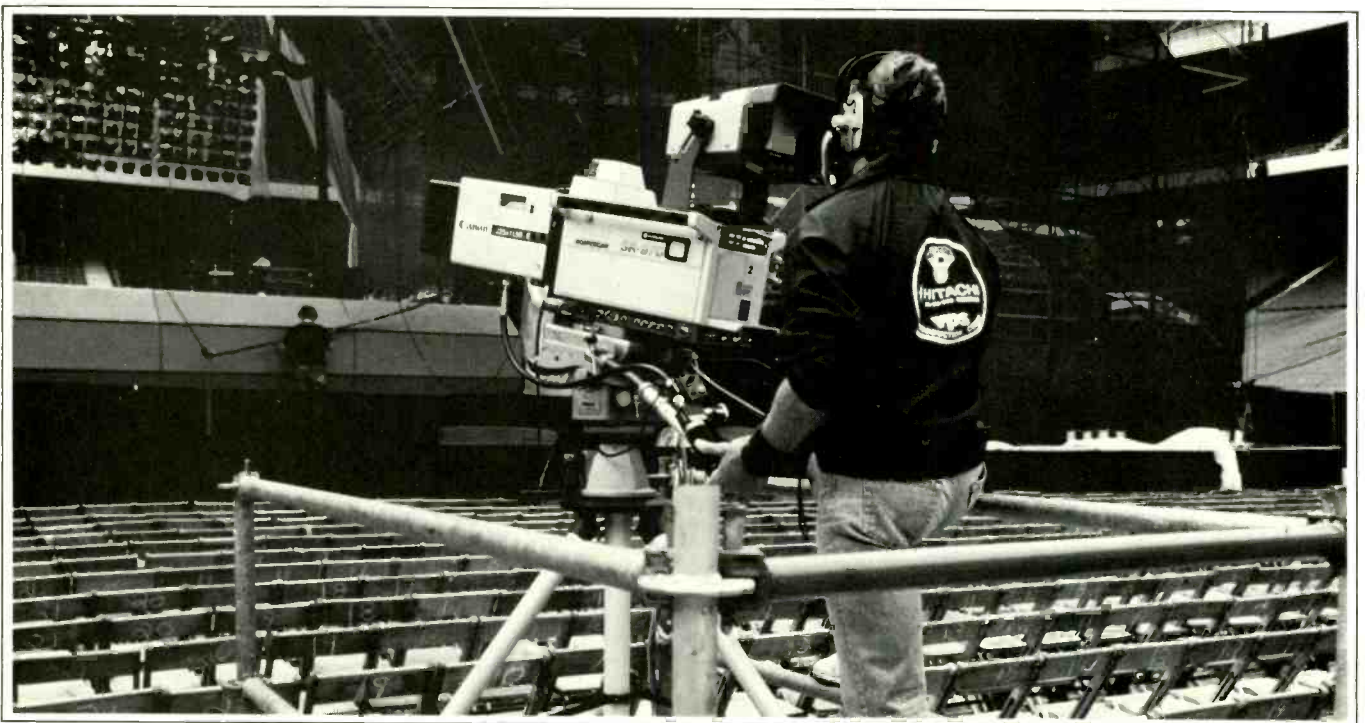
The largest producer of live concert videos in the U.S., VPS requires lightweight, low-maintenance broadcast cameras it can put on the road for long stretches.

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travelling package has complete self-contained auto setup, a separate box isn't needed. And any potential problems are confined to one head.

Although VPS earmarks two SK-97s and SK-970s for studio use, the ability to use both wherever they are needed is a welcome economy. Still, the greatest asset of the SK-97 and SK-970 is rockbottom reliability. To Azimzadeh, concerts are just like live TV—no one can afford any slip-ups, or an equipment failure.



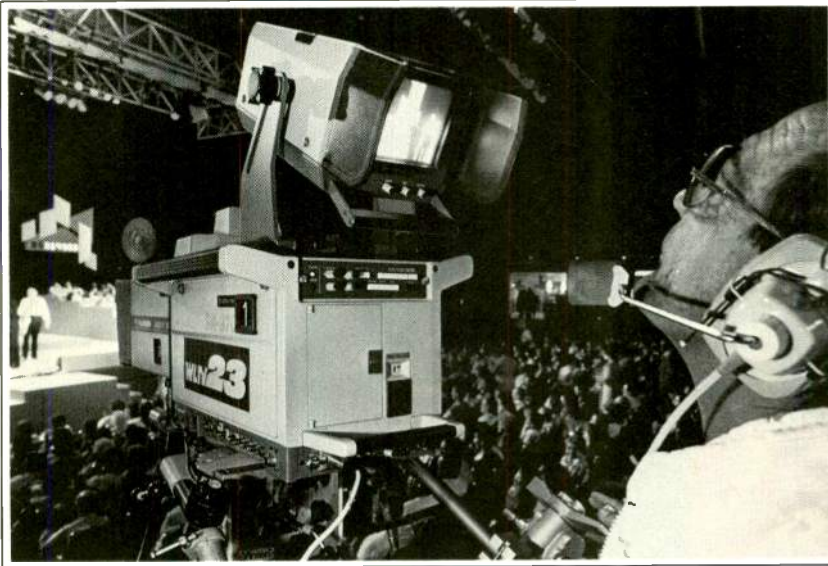
"Since each SK-97 and SK-970 has its own on-board computer, I can set everything up at the same time automatically."

Terry McIntyre, Remote Supervisor
F&F Productions, Inc.
St. Petersburg, FL

As a mobile production facility covering sports and large outdoor events for local and network TV, F&F needs broadcast quality on location.

They also need fast, independent setup. So they keep three handheld SK-97s and four compact studio SK-970s

permanently stowed on one of their trucks. And with complete computerized auto setup on-board each camera, the crew can set all of them up at the same time from parameters stored in memory without having to worry about drift or last minute adjustments.



The SK-97 and SK-970 also perform superbly under low-light conditions. As a result, notes Chief Engineer Dennis Lusk, both can use very large lenses. And with real-time registration compensation automatically correcting for any changes throughout the travel of zoom lenses, the cameras are ideal for the demands of sports coverage. Resolution and colorimetry are also unsurpassed, according to Bill McKechnie, another Remote Supervisor. In fact, the SK-97 is often run by F&F as a "hard" camera, in place of the SK-970. Location recording is done on two Hitachi HR-230 1-inch VTRs.

Most important, however, is the almost complete interchangeability of both cameras. Not only are they easy to work with, but they are also easy to link up. And so similar electronically, a single set of spares can cover any potential emergency.

"The SK-97 is a real mini-cam that can be completely integrated into a total studiowide auto setup system!"

Bill Weber
Vice President for Engineering
WHYY Television
Philadelphia, PA

WHYY has extensive production facilities at Independence Mall and more studios on the drawing board. To plan for this rapid growth, WHYY sought a family of broadcast cameras that was as flexibly integrated as it was advanced.

While evaluating computerized camera systems, Bill Weber and his staff found that the Hitachi SK-110 studio unit and the portable SK-97—with the same basic complete auto setup—were so perfectly matched in colorimetry and resolution that pedestal and handheld work could be combined without a hitch. And because the SK-97's auto setup is also completely self-contained, both cameras are as electronically independent as they are geared toward common console control.

Staffers like Senior Video Engineer Bob Miller consider the SK-97's auto setup easy-to-use, as well as accurate and reliable. And the on-board lens and scene files give operators instant-filter and color correction at each camera head, in addition to the console. So the staff looks upon the Hitachi SK-97 as a studio camera that they can shoulder.

As facilities grow, WHYY's Weber knows that he will have the flexibility to configure and reconfigure SK-110s, SK-970s, and SK-97s to meet production requirements of most any complexity without encountering technical snags. In fact,



with Hitachi cameras at other sister stations in the Eastern Educational Network, joint productions can even be assured of a common look.

For a demonstration of the SK-97 and SK-970 in your studio, contact Hitachi Denshi America Ltd., Broadcast and Professional Division, 175 Crossways Park West, Woodbury, NY 11797; (516) 921-7200, or (800) 645-7510. Canada: Hitachi Denshi Ltd. (Canada), 65 Melford Drive, Scarborough, Ontario M1B 2G6; (416) 299-5900.

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TELEVISION

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Boston's WVJV Provides Big-Station Look

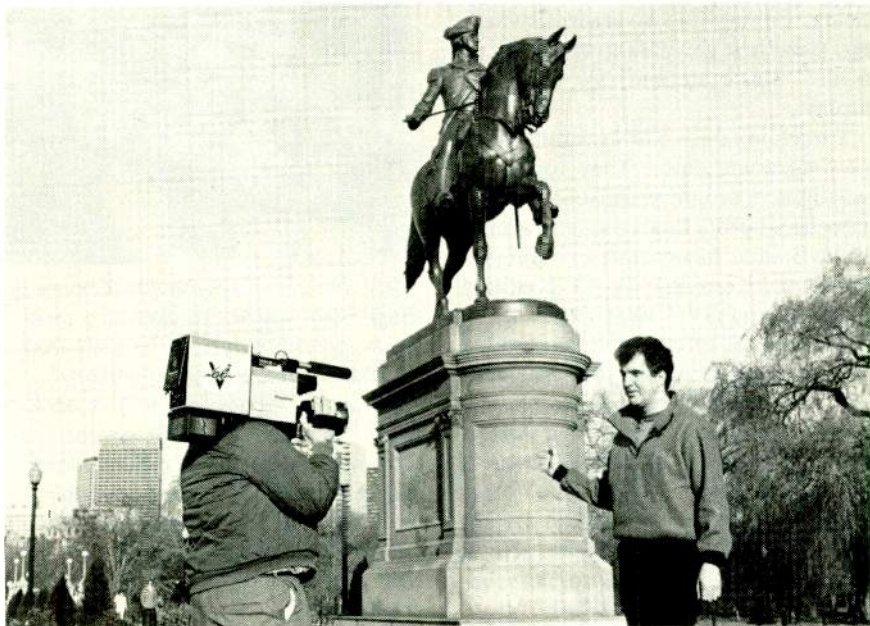
By C. Robert Paulson
Special Projects Editor

WVJV, Channel 66 in Boston, is a pioneering television station. From its beginning, veteran radio broadcasters and cofounders John Garabedian and Arnie Ginsburg conceived WVJV as a 24-hour/seven-day music video station whose programming would cater to the Boston market's 18-34-year-old demographic group, and would feature short music videos. Programming is radio style, with live "VJs" (video jockeys) hosting carefully programmed day-part segments.

Station design consultant Peter Fasciano, working with Lake Systems (who provided both hardware and software systems), concluded early in WVJV's planning stages that a traditional technical facilities design wouldn't work for this station. He decided that specifying a wide range of tape formats—from ¾ U-Matic to one-inch, to quads for station break automation—would require a sizeable technical staff for operation and maintenance. After intensive analysis of all available equipment, Fasciano recommended a one-format approach, Panasonic's half-inch M-format equipment.

WVJV was helped in its decision to install the M-format system by WNEV, Boston's Ch.7. Karl Renwanz, WNEV director of engineering at the time, had been using Recam field systems and studio VCRs successfully in news and program production for two years.

According to Charles S. (Buc) Fitch, WVJV director of engineering, M-format's video and audio performance specifications and the easy remote control of its portable and studio VCRs all contributed to its choice as the station's recording standard. It needed



WVJV cofounder and morning man VJ John Garbedian regularly "takes the show on the road." He tapes his music video intros and wraparounds, as well as station promos, in familiar Boston-area locations with Panasonic's Recams.

top quality video performance to compete with the half-dozen affiliates and independents already established in the Boston market, and an on-air signal that would be as live-looking as the rest of the competition. These considerations ruled out cassette-based ¾-inch equipment for field production and editing. In addition, going to one-inch format for studio operations and editing, and quads for station breaks, was expensive and labor-intensive.

Components

In order to record, edit, and play FM-quality stereo audio, WVJV required a VCR format with two equal-performance channels. More importantly, electronic components and heads in off-the-shelf machines had to be assembled and adjusted to very tight tolerances for cochannel phase delay. Panasonic's M-format met these standards, and had the additional advantage of a built-in Dolby noise reduction system. Ginsburg observes, "When we made our choice of M-format at the 1984 NAB, we were actually equally con-

cerned with audio and video."

Finally, the entire complement of recorders located throughout the station had to be remote controllable by a variety of microprocessor-based systems. These were to be located in the station's editing suites, La-Kart master control facility, studio control rooms, and the traffic department. Panasonic's RS-422 serial interface offered all the necessary control versatility—at command and reaction speeds far higher than those available on standalone systems operating on older RS-232 protocols.

M-format ties station together

There are 23 Panasonic AU-300B VCRs in operation throughout the station's facilities on the top floor of Point West Place in Natick. Twelve VCRs are located in the multifunction facility dubbed the "Space Station." Ten units in the Lake Systems La-Kart video cart system are computer-controlled as a complete automatic programming system. These broadcast all music videos,

TELEVISION PROGRAMMING

commercial station breaks, IDs, and promos against a computerized log prepared by the traffic department. Two more transports are provided in this area as maintenance substitutes and on-air backups.

The AU-300Bs in the studio control rooms are operated from the production switcher during special feature show taping. Editing live by camera switching, these first generation tapes then go to the "Space Station" for scheduled airplay.

Three cuts-only editing suites operate long hours daily. They rough cut and tighten program and commercial sequences before final editing or airing. An A/B suite incorporates a more sophisticated Convergence 203T editing controller and GVG 100 switcher.

The digital effects and production suite contains three one-inch machines and a 3/4-inch U-matic deck along with an AU-300B. It is used for commercials and programs assembled from all popular tape formats, as well as other live and taped feeds, with almost unlimited tape motion and digital effects processing. The final air product is always done on M-format tape.

Four Recam EFP systems are always on the move outside the studios, shooting both commercial and creative master footage, and VJ stand-ups for later broadcast. These field shoots have had almost as dramatic an impact as the on-air signal in establishing the station as appealing and different to the target au-



WVJV director of engineering Charles S. (Buc) Fitch watches as operating technician James Smith runs the show from the master control room (familiarily know as the "Space Station"). A bank of 10 Panasonic AU-300Bs are incorporated into the station's La-Kart automation system. AU-300 cueing and roll operations, as well as video transitions, are computer-controlled using Lake Systems software prepared by the traffic department.

dience. Using microwave feeds, the Recams are also used for live and tape-delayed feature programming.

Using all M-format machines in the operations mainstream means that several generations of editing and dubbing are possible without deleterious effects of "NTSC footprints" on the video signal quality of final tapes. The station does maintain an NTSC signal routing system, but it is used only to send incoming video feeds to M-format recorders.

"Big bang" button

Besides the all-M-format recorders, another essential component of the station's operation is the La-Kart software package and on-air automation system. By pressing a single "big bang" button, the VJ activates an entire sequence of events that gives the viewer the impression that the station is being run by a large, well-rehearsed control room crew, taking commands from a highly creative director.

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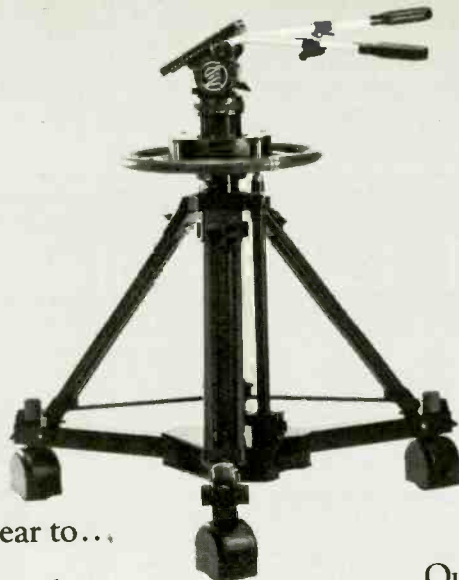
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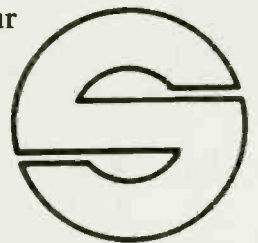
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TELEVISION PROGRAMMING

als. On tapes shot in the field or studio which require no editing, the operator simply enters the cue points directly into the La-Kart playlist, eliminating the need to dub the material to a separate play cart.

The log also includes instructions for character generator pages and still store displays, which can be called up automatically based on time code cues, and can be integrated with live video. This is accomplished by setting up the GVG 100 switcher with preprogrammed special effects as well as for automated master control operations. The same keystroke that starts the VCR also calls up the appropriate character generator page and instructs the 100 to super the two and make a transition effect.

Also controlled from the La-Kart log and activated by the keystroke are zoom, focus, pan, and tilt settings for two cameras, which can be trained on the VJ, a guest, or other features in the studio. Thus, it is possible to integrate live material together with prerecorded tapes, all completely automatically.

"There are many more people on the music and programming creative staffs than there are in engineering and oper-

ations," WVJV's Fitch points out.

Technical wisdom

Several months after WVJV's February 1985 on-air debut, cofounders Garabedian and Ginsburg and engineering director Fitch freely testify to the wisdom of choosing its technical system. The station runs around-the-clock without shift technicians



Editor Jay Eidt works in one of three cuts-only editing suites with other AU-300 VCRs.

tweaking or operating any systems. On-air picture and sound quality are virtually as real from tape as they are when actually broadcast live.

Broadcast off-air production smoothly flows from camera shoot to master tape completion. Tape interchangeability and equipment reliability, as well as functional accuracy, have met all the station's expectations. And, the Recam cameras have the resolution and sensitivity needed to set up remotes where they're needed.

Ginsburg reports that the station is meeting its startup goals with help from the Panasonic equipment. "We're both playing to a growing audience," he says. "We're motivating people to call in, just like radio, and we're creating commercial messages that sell the market to our advertisers' growing satisfaction." Fitch adds that, "Some of our callers have indicated that the sound signal by itself is helping to build an audience that tunes in for long periods throughout the day. That's good news to us. An important objective of our programming philosophy and technical specifications is that WVJV should make equal sense to our viewers without the picture. Viewers tell us that they turn on all the sets in the house and listen, even if they can't see the picture."

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The key to the SE-6 is our unique Time-Tracker system. For the first time, you get total front-panel programming. There are no computer-style controls or complex commands. With Time-Tracker, you simply perform the front-panel operations while the internal computer automatically stores every step. Including trajectories and mix profiles. So you're free to concentrate on ideas instead of details.

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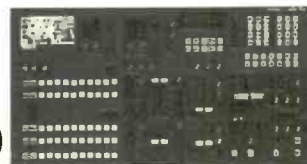
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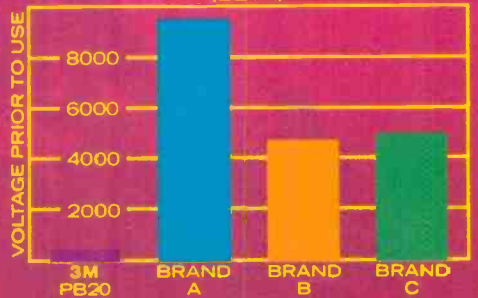
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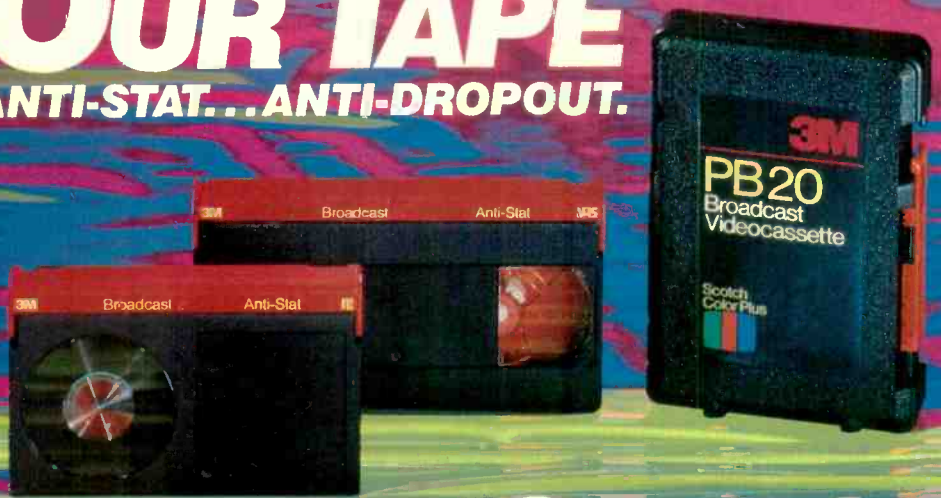
We know you need a 1/2-inch videocassette that can go anywhere without picking up static-drawn souvenirs that will destroy your picture. So we developed the exclusive Scotch™ Anti-Stat Treatment, giving our new 1/2" Broadcast Videocassettes the industry's lowest electrostatic charge levels for unsurpassed dropout performance. With outstanding color reproduction and signal to noise. Hanger cases are available in VHS and Beta, in 10 and 20-minute lengths. All distinguished by our red doors and hubs for easy Anti-Stat identification. All backed by our engineers, just a phone call away. All the more reason we're number one in the world of the pro.

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Digital Aims at Audio Carts

One topic sure to be hotly debated at this year's radio convention is digital audio computers, being touted as replacements for traditional cart machines.

By Judith Gross, Associate Editor

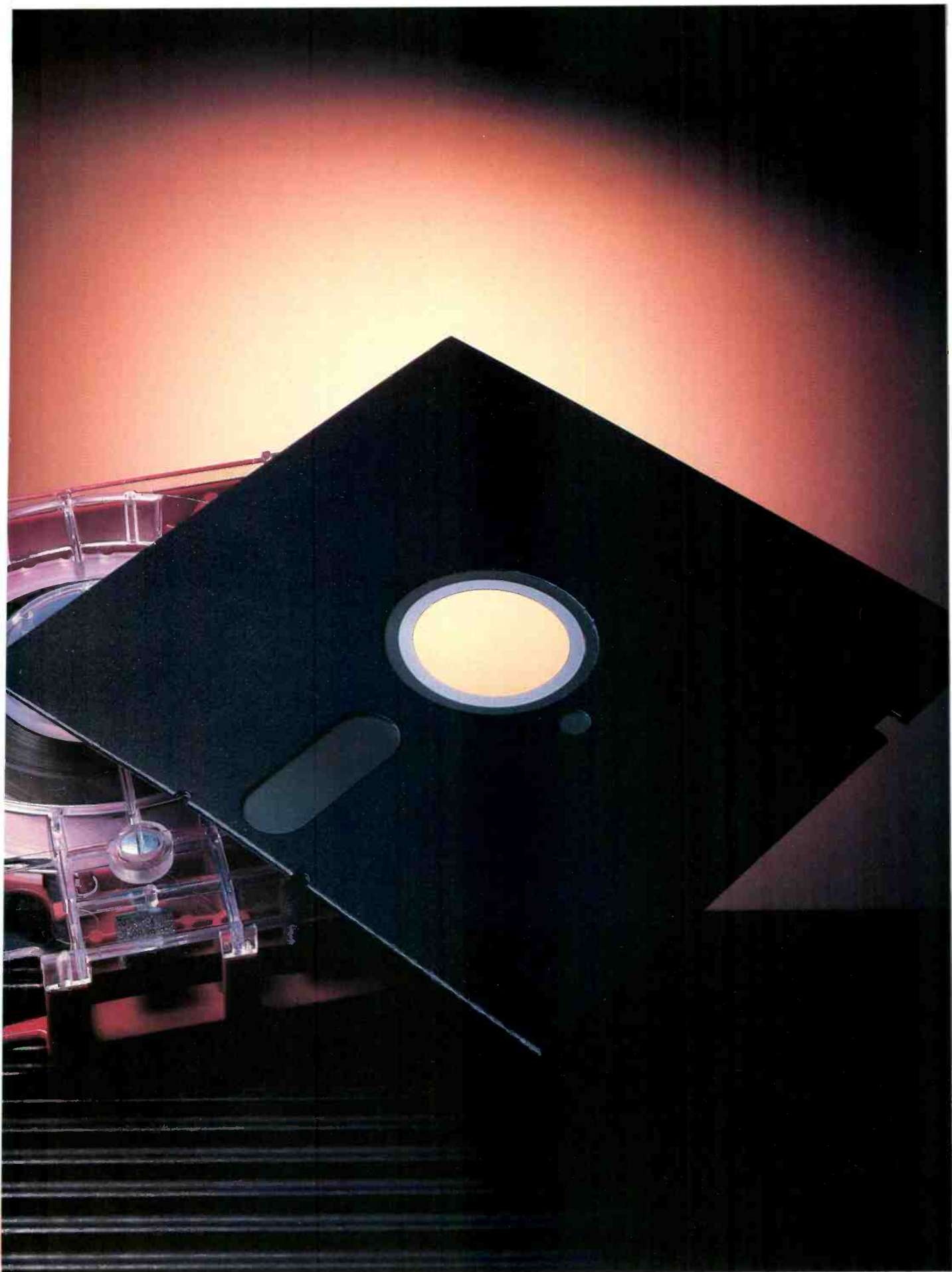
The day of the cart machine's domination in radio and audio production may be drawing to a dramatic end. The ubiquitous machine, which has been around since the first Spotmaster rolled off the assembly lines in the late 1950s, is about to go through a transformation that could change the entire thinking surrounding preproduced audio, and alter the way a radio station conducts its on-air business.

It's all a result of digital technology, which has been slow to catch fire except in the world of record production. There are few radio stations clamoring to buy digital reel-to-reels, or willing to spend the money on the equipment necessary for analog-to-digital conversion. And only a handful are taking full advantage of the audio quality available on compact discs, especially given the lack of a convenient and inexpensive way to record laser discs.

Enter the computer, which is solving some of the inconveniences and remedying many of the other objections broadcasters have with digital equipment. As of this year's NAB show, no less than four manufacturers were poised to enter the marketplace with digital machines designed as direct cart machine replacements. And some, like Broadcast Electronics, a pioneer in cart machine production, are willing to concede that the traditional cart machine's days are numbered.

"The day is going to come when the electro-mechanical cart machine will be displaced with a digital unit," asserts BE's Larry Cervon. He adds that there are many forms a digital product could take, with the crucial concern being the cost—the most amount of storage time for the least expense.





Studio & Transmitter Maintenance
Selling For and Against Combos
Grooming Program Directors to Be GMs
Music Licensing—Paying the Price?
The Incredible Case for AM Stereo Now!

1:45-5:00 p.m. Leadership & the One Minute Manager

6:00 p.m. Wine Tasting Reception

7:00-8:30 p.m. Rock N' Roll Revival,
Dick Clark host

8:30 p.m. Hospitality Suites Open

Friday, September 13

7:30-8:45 a.m. Specialized Sales—Co-op, Phone,
Jingle Packages

Effective Direct Mail Campaigns

On-Air Station Promotions that Work!

9:00 a.m. Exhibits Open

9:00-10:30 a.m. Joint Satellite Feed RTNDA/
Radio '85

Training for New PDs

Sales Staff Structure & Compensation

Effective Management Communication

AM/FM Improvement

Format Rooms: Country, Big Band

10:45-12:15 p.m. How to Sell Promotion Without
Giving Away the Store

Older Demographics or Selling Better

Financial Planning & Budgeting

Popular Research Techniques

Competitive Audio Processing

Longform Network Programming

Format Rooms: A/C, News/Talk

12:30-2:30 p.m. Radio Awards Luncheon

2:45-4:15 p.m. New Financing Techniques for
Buying and Selling Stations

Maximizing the Use of Trades

Effective Radio Station Marketing

SCA Update & Opportunities

Managing Cash Flow

Format Rooms: CHR, Classical

2:45-5:30 p.m. Marketing Warfare—Jack Trout

6:00 p.m. Hospitality Suite Night

Saturday, September 14

7:00-8:00 a.m. 5K Fun Run

9:00 a.m. Exhibits Open

9:00-10:30 a.m. Strategies in Radio Marketing
Warfare

Morning Radio Success Stories

News in a Music Format

The Future of Broadcast Engineering as a
Profession

Rep Roundtable

Format Rooms: Beautiful, CHR

10:45-12:15 p.m. Marketing—The Competitive
Edge

Sports Programming

Sales Forecasting & Budgeting

New Programming Competition for Radio

Developing New Local Dollars

80-90 Allocations, Applications & Opportunities

Format Rooms: Country, News/Talk

12:15-1:00 p.m. Lunch Break

1:00-2:30 p.m. Managing the Small Market Station

Sales & Programming Interaction

Rates & Revenue—How to Maximize Inventory

Show Prep—Making Every Break Count

The New Technologies

Women in Management—Programming, Sales,
Station

Format Rooms, AOR, Big Band

1:00-4:00 p.m. Personnel Management—
Bill Brower, Sterling Institute

2:45-4:15 p.m. Acquisition Through
Computerization

National Sales—National Growth

Programming Looks at Ratings & Research

Money Making/Self Liquidation Promotions

Walking the Programming Tightrope

Format Rooms: Urban/Ethnic, A/C

6:30 p.m. Authentic Texas Barbecue

8:30 p.m. In concert, Eddie Rabbit and
Tammy Wynette

ent form, Digitalk offers only a voice-grade frequency response of 3300 Hz, and Cervon concedes a higher fidelity sound would be necessary before the product was widely accepted. But three minutes could easily accommodate a simple commercial cluster, legal IDs, or news actualities, although the memory capacity would have to be increased to produce stereo audio or a higher frequency response.

Broadcast Electronics is interested in finding out if the marketplace is truly ready for a digital cart machine replacement. And Cervon asserts that "we aren't promoting this for tomorrow." But the company is ready to commit it-

self to digital audio for the long haul, as evidenced by a letter of intent to license a slightly different type of digital technology from Compusonics, which is ready to enter the field with a cart replacement product of its own.

Floppy disks at work

One year ago Compusonics introduced its digital audio concept, an audio computer called the DSP-2000 Series. It incorporated both Winchester and floppy disk technology and was meant for professional audio production, with a cost of \$34,500 for a two-channel machine. The company

planned a consumer machine using the same technology, but has now announced that it will produce a pilot run of its consumer product modified for broadcast use.

Compusonics' DSP-1000 will be delivered to about 50 radio stations this summer, primarily to get input on its feasibility in the marketplace. It uses standard 5¼-inch floppy disks, formatted for an operating system unique to the Compusonics system. According to company president David Schwartz, the patented CMX software system employs a form of data compression. "We can put more audio into the digital format, so it makes the

The Orban 424A Studio Optimod.

Explained by us.

GAIN REDUCTION: Shows gain of the VCA (0 to -25db). Shows the effect of any control but OUTPUT TRIM and DE-ESSER.

INPUT ATTENUATOR: Adjusts drive to compressor/limiter, determining amount of G/R.

ATTACK TIME: Adjusts speed of response to input level increase. Fast: Peak limiter & compressor. Slow: Compressor only.

GATE THRESHOLD: Determines the input level that causes "gating"; VCA gain then moves slowly to IDLE GAIN setting.

OUTPUT TRIM: Adjusts VCA gain to control or prevent clipping as required. Effect is seen on VCA LEVEL meter. Not an Output Attenuator (Output Attenuator is located on rear of unit).

DE-ESSER OPERATE/DEFEAT: Activates or defeats de-esser control circuitry.

COUPLED/INDEPENDENT: Couples A and B gain and gating circuits for accurate stereo tracking.

COMPRESSION RATIO: Adjusts compressor from "looser" (2:1) to "tighter" (∞ :1).

RELEASE SHAPE: Linear: Compressor releases at constant rate. Exponential: Release starts slower, then accelerates.

VCA LEVEL: Shows peak operating level of VCA. Clipping occurs above approximately +2.

IDLE GAIN: Presets VCA gain when in gated condition or anytime unit is DEFEATED. Used for smoothing out transitions and for decreasing audible action of compressor.

OPERATE/DEFEAT: Activates or defeats gain control circuitry. Does not bypass any circuitry.

DE-ESSER SENSITIVITY: Adjusts threshold of de-essing. De-essing increases as control is turned clockwise.

Also available as a single-channel unit: Model 422A. Ask your dealer for a detailed brochure.

Reviewed by others.

"In addition to the measured performance being very good the subjective impressions of the unit were excellent. This product has many novel and highly practical features all of which are quite simple to use but need not be used if simplified operation is required. Overall a very good compressor/limiter, well made and easy to service."

Hugh Ford, *Studio Sound*
November, 1983

"Overall, the 422A/424A should prove to be a system of diverse capabilities, able to tackle the widest variety of material—once the user masters its operation. In addition, its solid construction and excellent service documentation should insure years of reliable operation. Such qualities are typical of timeless designs that tend to retain their value long after the accountants have depreciated them away."

John Monforte, *db Magazine*
July-August 1983

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Circle 133 on Reader Service Card

RADIO '85 Convention Exhibitors

The following is a preliminary list of exhibitors booked as of presstime. Companies whose booth numbers were not available are marked NA.

Exhibitor	Booth #	Johnson Electronics	
		Kalamusic	200
		LPB	916
The Ad Team	821	Marketron	523
All Star Radio	207	Marti Electronics	722,726
American Image Productions	818	Media General Broadcast Svcs.	535
American Women in Radio & TV	NA	William Meeks Productions	526
Analysis Technologies	901	Metro Traffic Control	928
Arbitron Ratings	716,617	Miller, Kaplan, Arase & Co.	226
Associated Press	610	Motor Racing Network	216
Audio Broadcast Group	337	Motorola, AM Stereo Div.	717
Audio Technologies Inc.	228	Music Director Programming	700
Auditronics	406	Mutual Satellite Services	622
Broadcast Audio Corp.	710	National Public Radio, Sat. Svcs.	321
Broadcast Electronics	600	Nautel	309
Broadcast Management Plus	434	NEC America, Broadcast Equip. Div.	343
Broadcast Music Inc.	735	Network Production Music	204
Cablewave Systems	816	Peters Productions	900
Call For Action	NA	Potomac Instruments	211
CBSI/Custom Business Sys.	510	PPA/USA-Dover	903
Clayton Webster Corp.	437	Public Interest Affiliates	634
Columbine Systems	400	Radio Advertising Bureau	527
Comark Communications	208	Radio Computing Services	NA
Communications Graphics	817	Radio Syndication Network	919
Continental Electronics	807,906-910	Radio Systems	423
Creative Works	727	Register Data Systems	210
Dataworld	820	Rockcom	616
Delta Electronics	317	Sacred Heart Program	723
Dielectric Communications	810	Sea-Tex Div/Si-Tex Marine	202
Dorsey & Donnelly Enter.	408	Leonard Sloan & Assoc.	623
Electronic Research	308	Snider Communication	435
Eventide	905	Society of Broadcast Engin.	436
Fidelipac	800	Spotwise Productions	NA
Film House	638	Strata Marketing	217
Flash Technology	206	Systemation Corp.	316
David Green Broadcast Consult.	911	Tapscan	825
Harris Broadcast Group	500	Tennaplex Systems	522
Health Comm.	335	TFT	320
Howe Audio	424	TM Communications	229
ITC/3M	907,909	US Tape & Label Corp.	929
J&H Music Programming	NA	United Ropeworks (USA)	327
JAM Creative Productions	417	Weather Services Corp.	917
Jefferson-Pilot Data Systems	326		307

whole concept of digital audio viable," Schwartz says. He explains that a formatted floppy holds 6.6 Mb of data, equivalent to 10 minutes of mono or five minutes of stereo.

Compusonics is aiming its DSP-1000 straight at the cart machine market, and has priced it competitively at \$3000—a price that Schwartz concedes will need to be examined, to see if "it's fair to us as well as to broadcasters."

He also says the company may yet

produce an actual spot recorder, perhaps with a micro-floppy. But in its current form, Schwartz thinks the DSP-1000 will be used the same way as a cart machine, with spots, jingles, IDs, and even an entire music library stored on floppy disks and used at random the way carts are now.

Compusonics' digital audio products have a high frequency response, about 20 to 20,000 Hz, and Schwartz envisions a day when the DSP-2000 and the

DSP-1000 will be part of a complete audio production process, with production houses, syndicators, and hub stations employing a 2000 to record and produce high-quality audio and medium and smaller stations playing them back over the 1000.

Are floppies the answer?

Despite the promise being shown by floppy disk-based systems, not every-

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It really is a jungle out there. And in that jungle, Otari's MTR-10 audio machine gives you the ammunition you need to stay alive—like three speeds, micro-processor control, a built-in cue speaker, and an optional ten-memory autolocator.



The MTR-10's "creative arsenal" helps you keep pace in the tough, competitive world of broadcast.

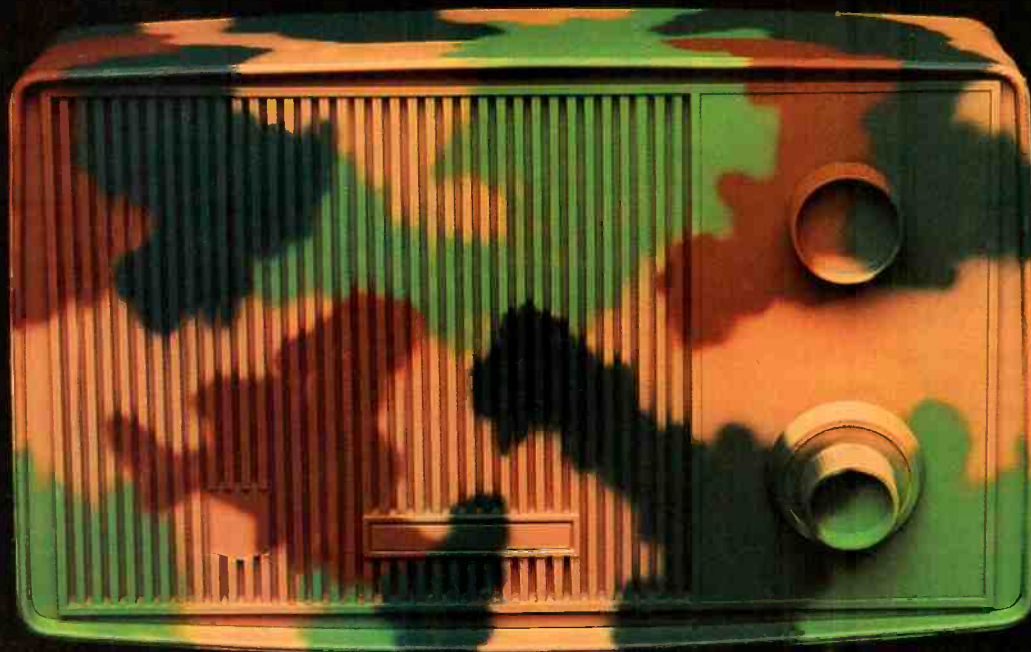
Whether you're doing spots, editing, or working "live", this rugged machine provides the features you'll need for the recording tasks of tomorrow. As one of our customer's put it, "Everything I even *think* I want to do, I *can* do on this machine."

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Gotham Audio's Systex audio storage system, showing HP host computer and audio console, in use at a broadcast production studio.

one is convinced that floppy disks will come into widespread use for audio storage.

Floppy disks require very careful handling, as several industry insiders have noted. No doubt one of the reasons traditional tape carts have been around so long is their durability. They can be dropped, stacked, jammed into machines, and left to gather dust, and can still usually deliver quality audio. Could radio announcers and technicians adapt to the more delicate handling a floppy requires?

Gotham Audio, which is currently marketing a digital audio computer of its own, doesn't think a floppy disk-based system is the ideal way to go. Engineer George Johnson says "It would be hard to envision DJs with a handful of floppies, cramming them into machines and the like."

Gotham's EMT 448 Spot Recorder uses removable hard disks, which are more expensive than floppies, but more durable and more convenient than the Winchester disk technology of the company's larger production product, the Systex.

Gotham offers two sampling rates in the EMT 448: 48 kHz or a compressed 32 kHz version that will save on cost with some trade-off in quality.

"Broadcasters who want to save on money will opt for the 32 kHz," Johnson says.

He explains that at 48 kHz, a 5 Mb disk will store 26 seconds of stereo audio, and a 10 Mb disk 52 seconds of stereo. He points out that those times are close to the standard 30- and 60-second carts in use today. The 48 kHz machine will cost \$10,000 and be ready at the beginning of next year, Johnson says. Gotham also has a 100 Mb fixed, nonremovable digital audio machine for larger station applications.

According to Johnson, the company is banking on the removability of the disks, and the similarities to carts, to generate interest among broadcasters.

The target buyer is a station with a large volume of high repetition carts: jingles, IDs, promos, and, of course, spots. For such an application, \$10,000 might not be an exorbitant price to pay to eliminate the worry of wearing tape, tape head maintenance and repair, and loss of quality through degradation.

There are some drawbacks, though. The EMT 448 would not be practical for a station's music library, which may run as high as 3000 carts. Johnson is optimistic that hard disk cartridges will come down in price, but concedes that "they probably won't go below \$40 apiece" and even that figure is a few years down the road. A station might be reluctant to purchase a digital machine that would only accommodate part of its cart load. Still, removable disk technology is the way Gotham Audio believes the future of digital audio will go.

Winchester-based storage

Another audio computer manufacturer believes that the audio marketplace is ready to make the transition from tangible disks of recorded audio that are played as separate units to a keyboard selection of audio stored electronically.

Microprobe Electronics' Digisound is a Winchester hard disk-based machine with 332 Mb of storage per disk drive. President Dave Collins says the storage capacity equals 50 minutes of mono audio, 25 minutes of stereo, and that four disk drives can be used together for added storage.

Digisound features simultaneous record/playback capability, and has a frequency response of 20 to 20,000 Hz.

The cost of the machine is \$27,950 in mono, \$2400 additional for stereo, with each additional disk drive costing \$11,250. Collins says Digisound is designed to replace carts containing jingles, IDs, and spots, but not music libraries.

"There won't be enough storage for music available for years," Collins says. But he adds that Digisound already holds many advantages over cart machines, in instant access, and in sound quality.

One way it may be quite cost-effective, according to Collins, is in those stations already using cart automation systems. He estimates that a system

with 48 trays would cost about \$20,000, while for somewhat more than that, the Digisound "can instantly call up 300 10-second IDs." The other targeted markets for Digisound, Collins says, are sound production and motion picture companies, radio networks, and sound effects libraries. Wherever the technology finds a home, however, Collins believes the cart machine's time is coming to an end.

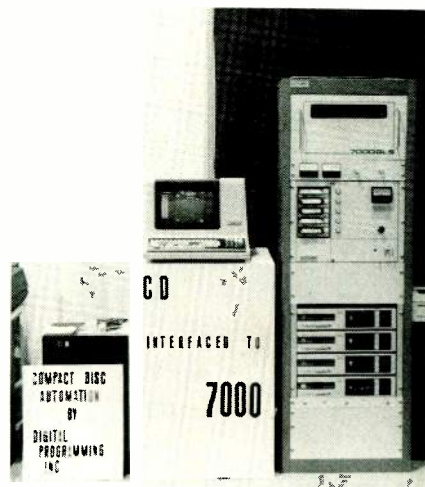
"Cart machines have gone as far as the technology can go. The only place to go now is digital," he says, adding, "Anybody who has been dealing with cart machines a long time has to be excited over this. People were coming up to us at the NAB saying, 'You mean we don't have to use cart machines any more?'"

Programming via CD

The biggest drawback to all the machines being presented as digital alternatives to the cart machine so far is storage capacity. There's not enough of it, and it's still too expensive for the average user. And while that is expected to change rapidly in the next few years, it may pose some immediate limitations on widespread acceptance of digital machines.

Broadcast Electronics, Compu-sonics, Microprobe Electronics, and Gotham Audio all appear to be aiming at the spot-jingle market. But music libraries comprise the largest portion of the radio industry's cart load, and it's not likely digital technology will succeed until the manufacturers find a way to handle both music and commercials.

One company that is trying was very



DPI demonstrates its radio programming discs on four Pioneer P-D70 disc drives, rackmounted and on-line with Schafer 7000GLS Automation System and terminal.

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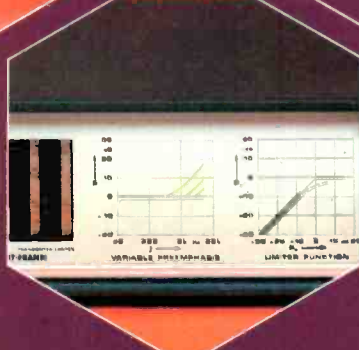
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visible at this year's NAB show. Digital Programming Inc. is one of the first companies of its kind to offer digital music libraries on compact discs, to radio stations.

President Ron Erwin says DPI produces its CDs at a small plant in California, which saves on costs, and that the company intends to record discs containing music of many varied formats, and syndicate them much the way music programmers syndicate music on tape or vinyl records.

DPI's service is especially suited to stations with automated music formats, because a special code on the disc can cue the next function. But Erwin says it will work for other types of stations also, and that the hope is to record rock, oldies, country, and light or soft music—in fact, all except rapidly changing top-40 music. The company will also custom-record a station's music library.

Up to 72 minutes of music is available on each disc, and Erwin says when the system is hooked up to a CRT, text with pertinent bio and specific information about each cut can be displayed for the DJ.

Up until now, stations haven't exactly flocked to the CD corner for several reasons. The main reason is that record companies give vinyl records out as promotional material free of charge, while they have been charging for CD recordings. Another is that CDs take a long time to record because there are very few recording plants in existence. Erwin, noting that DPI would like to work with record companies to solve both of those concerns, says "We're saying they can come to us and we'll put out the new recordings which they can provide to the radio stations."

But another real problem has been the lack of hardware. CD players are in abundance on the consumer front, but have been slow to appear in radio stations. Erwin believes that stations will be using consumer CD players on-air more, and that the better audio quality listeners with home CDs will cause a greater demand for digital recordings.

"Once you hear it on CD, even on a minimal system, you can hear the difference," Erwin maintains.

One other promising hardware development is the automatic CD changer, such as that being experimentally marketed by Sony. The unit holds two stacks of CDs, with a mixer placed between them so the DJ can dissolve from one cut to another. It also has such applications as a CD jukebox, holding

dozens of recordings in a stack, or for a disco-type environment.

Other than that, CD support hardware has been an untapped market. One company, Bryston Audio, has introduced a preamp just for CD players, but new announcements as such are scarce.

CD/cart marriage

At least two other leaders in the audio field also believe there will be a marriage of sorts with CDs, but as cart manufacturers, both International Tapetronics Corp./3M and Pacific Recorders think that marriage will be between CDs on the music side and cart machines, perhaps incorporating some form of digital recording technology, for spots and IDs.

"The digital computer systems we're seeing today are a very crude prototype of the type system we'll be see-



At the NAB show, ITC's Mike Bove (left) demonstrates Delta cart machine and Studer CD player to Jon Bennett of KKQB, Houston. Music from the CD was recorded onto cart, and the CD and the cart were played simultaneously.

ing in the future," says ITC's Bob Bomar. "Future machines will probably use something much more sophisticated, like magnito optics."

Bomar believes the cart machine will be around for a long time to come, and feels that other types of digital technology may appear on the scene that will prove more feasible than the machines emerging today.

Bomar says any digital technology would have to find a way to incorporate both spot loads and music libraries before gaining acceptance among broadcasters who "don't have an abundance of cash to spend on every glimpse of new technology that comes along." He points out that conversion of radio stations to digital audio would require

more than just digital record/playback capability, but would also mean system upgrades in the entire audio chain. Because of this, even though listeners may demand better audio after listening to home CDs, he says they probably won't get it.

"It doesn't make sense to invest in this technology today, because by the time it's transmitted, a listener can't tell the difference," Bomar says.

In fact, ITC ran a demo at the NAB using its Delta cart machine and a Studer CD player. Music from the CD was recorded onto cart, and the CD and the cart were played simultaneously, with the listener allowed to switch between hearing the cart and hearing the CD.

"Ninety percent of the trained ears of chief engineers couldn't tell the difference between the two," Bomar says, and at least one station CE purchased the Delta machine on the basis of the demonstration.

"We're not trying to prove CDs aren't good," Bomar explains, "only that the optimum way to get the finished audio is onto cart, preferably recorded from a CD source, rather than a reel of tape or a vinyl record."

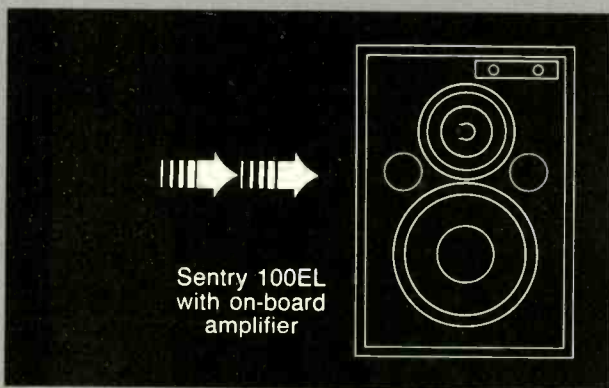
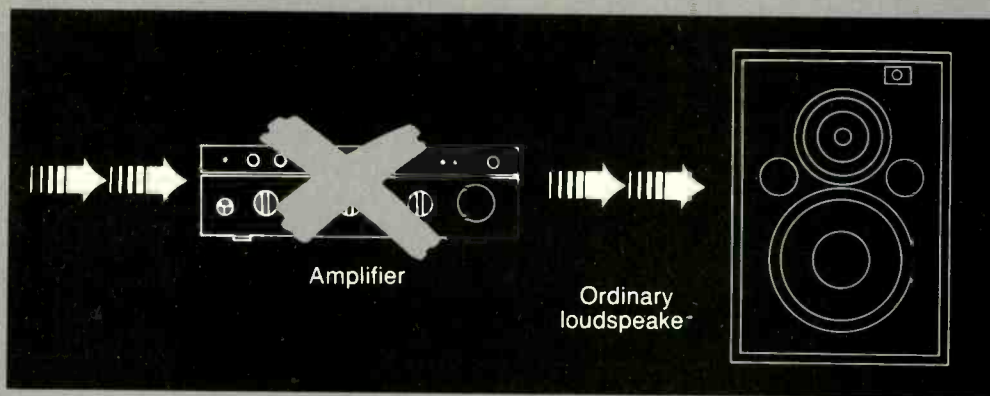
Pacific Recorders launched a similar demo at the NAB, but also included an eight-track, one-inch studio master, from which the demo cart was recorded. In the choice for the best quality audio, the master came in first, the cart machine second, and the CD last, according to company president Jack Williams.

"Cart machine makers are putting state of the art technology into their machines," says Williams, and he adds that carts today can deliver more bandwidth than CDs.

Cart machines and cart makers are making several strong arguments against the widespread acceptance of the digital audio computers about to hit the marketplace. One is the fact that cart machines have worked themselves into almost every aspect of audio production and may be considered indispensable by many stations.

Another is the compatibility of CDs with the state of the art cart machines currently being manufactured.

And yet to be reckoned with is the development of tape-based digital recording systems such as longitudinal thin-film cassettes and the digital recorders being developed by the Japanese for the consumer market which uses microcassettes and a rotary head, VTR-like recording system.



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According to Fidelipac's sales director Scott Martin, the essential argument is that there is already a huge installed base of cart machines, with the combined national and international market estimated at 8000-10,000 units yearly and growing. Are stations going to be willing to invest in a completely new technology which doesn't offer that many substantial advantages over the existing systems?

"And first," Martin observes, "they've got to solve the storage problem. Three minutes just isn't enough, whereas virtually any length can be accommodated on a cart."

Even if digital audio does come about, Martin isn't convinced it will take the form of the audio computers, but instead will be incorporated right into a cart machine. The only reason it isn't being done right now, even though the technology exists, according to Martin, is that cart machine manufacturers can offer very high resolution audio in their current models at a much lower cost.

"With the addition of external processing we could have almost the same

performance with analog machines, as far as phase, flutter and signal-to-noise ratio, as we could in a digital machine, and most listening environments don't require that kind of dynamic range."

Like Bomar and Martin, Pacific Recorders' Williams thinks the union of CDs and cart machines in a radio station is a good one, with CDs for the music, carts for IDs and spots. And he points to some inherent problems with the new digital record/play machines being touted as cart machine replacements.

"At the cost and prices we're hearing, it's too expensive," Williams maintains. "Plus, broadcasters are generally a conservative lot. I think they'll wait and see if someone's music library crashes first."

If digital does make inroads, Williams believes that it may be in the form of the digital longitudinal cassette: thin-based tape in a digital format housed in a cassette played at 3 3/4 ips, which Matsushita recently demonstrated as one likely possibility. And, he says other systems may be under development as well.

Farewell cart machines?

Does "radio have to change?," as predicted by DPI's Erwin. Or will the digital record/play units being targeted as cart machine replacements go the way of quadraphonic stereo, as one cart manufacturer has suggested?

BE's Cervon says he wouldn't forecast acceptance of digital in place of carts happening in as soon as five years, or as long as 10, noting "it took a generation or longer for stations to replace records with carts." But he believes a change is coming, and as one of the original pioneers in cart machine production, Cervon says his company "certainly wants to be in the forefront of the development of the new technology."

Although digital manufacturers with heavy investments in R&D would like to see their approach become the standard, and with Compusonics already starting to license its technology to other manufacturers, they all recognize the importance of hearing from broadcasters after actual hands-on experience.

BME

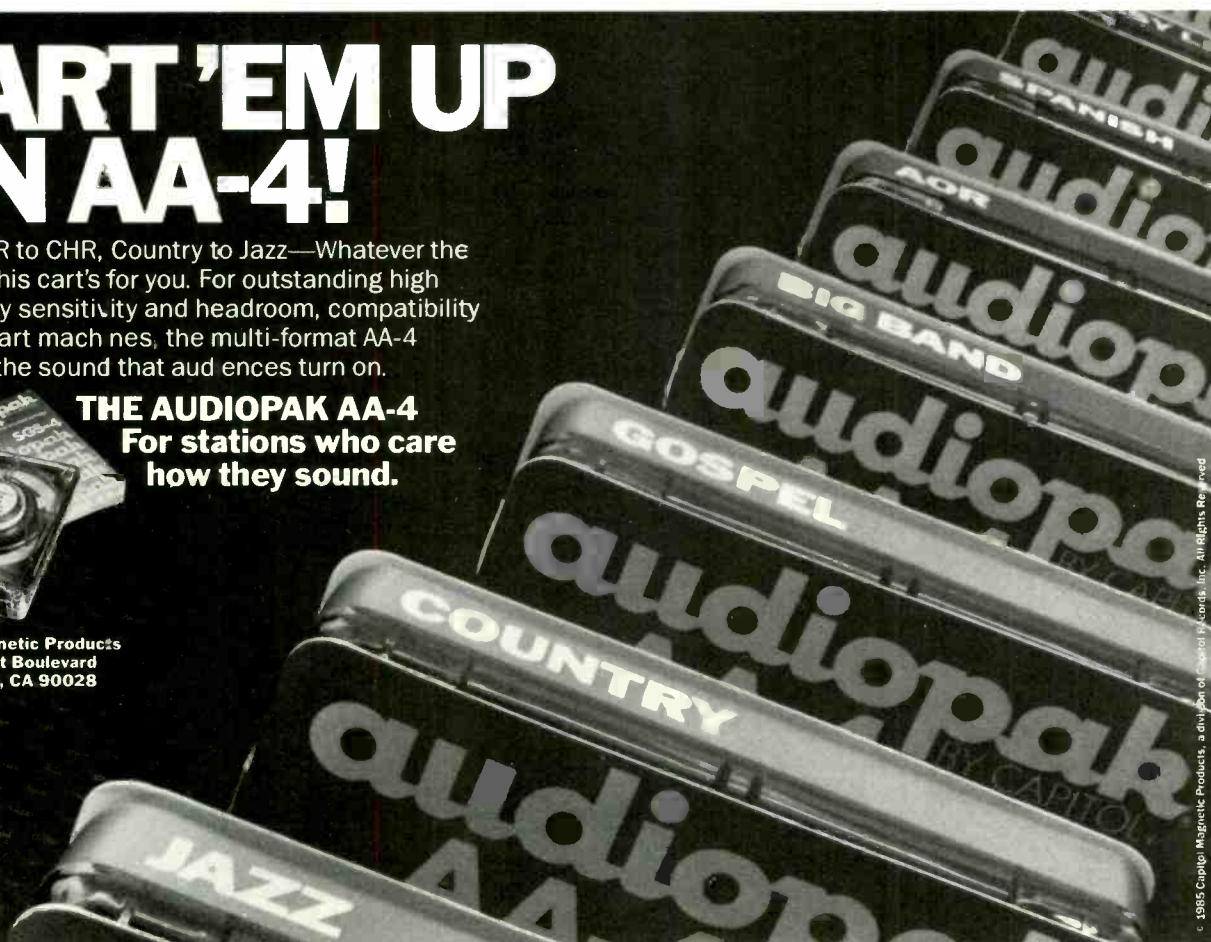
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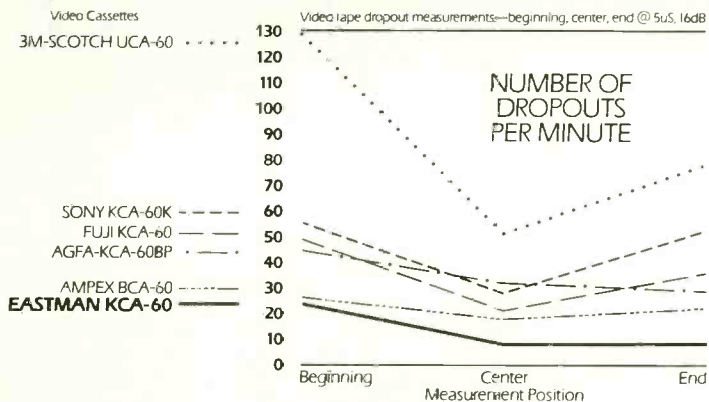
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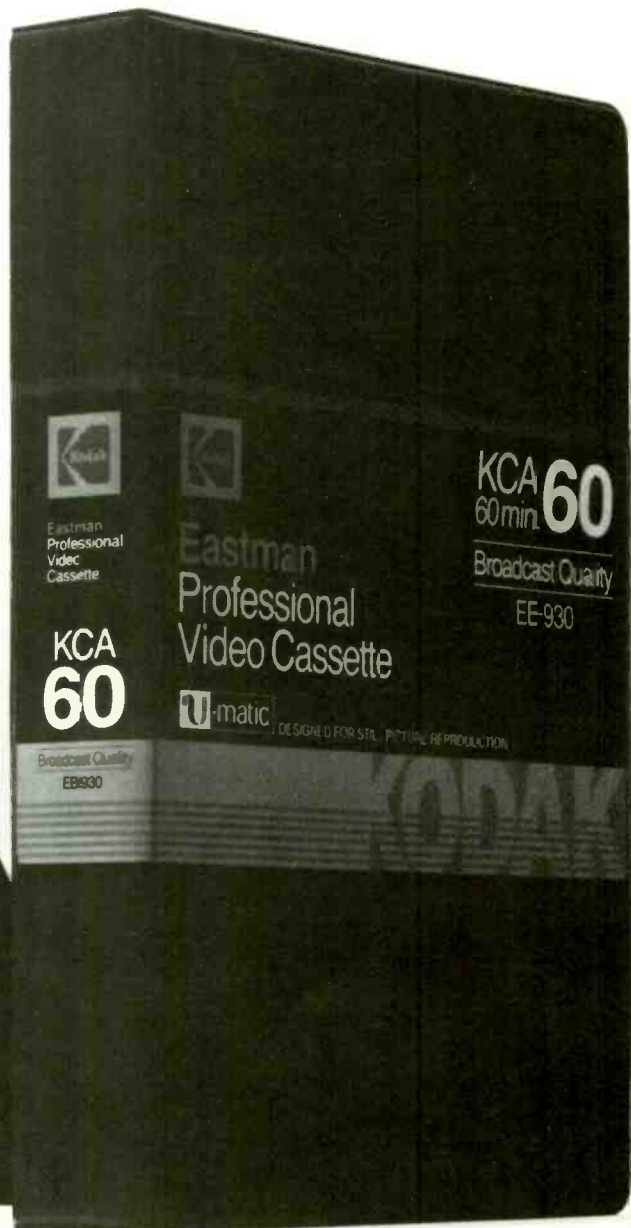
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SETTING UP THE IN-HOUSE GRAPHICS STUDIO

Whether your ambitions are modest or mighty, setting up an in-house graphics studio requires the right combination of talent and technology.

By Eva J. Blinder, Senior Editor

With a price tag that can run into hundreds of thousands of dollars, the in-house graphics production studio has generally remained beyond the grasp of the vast majority of local television stations. Classy graphics, however, are a necessity of life in today's highly competitive markets. A few stations have managed to justify the cost of in-house graphics, but most have had to rely on outside production companies for their logos, IDs, and bumpers.

Now that graphics and special effects production equipment is becoming more and more affordable, however, local stations are finding they can do the work in-house. This trend started several years ago, when TV news people began to discover the benefits of using a special effects device to squeeze an illustration into a box over the newscaster's shoulder, and creating the illustration in the box with a digital art/paint system. At the same time, TV news discovered it could present weather satellite and radar data as colorful maps.

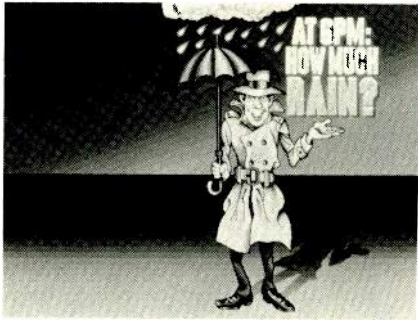
Even more recently, lower-cost graphics systems have enabled stations to set up their own graphics production studios. A typical studio might have one or more art/paint systems; a digital still store for capturing created images; a means of animating digitally created sequences; a production switcher and special effects system to integrate the digital graphics with other program material; and so forth. Thus, while the electronic graphics studio still produces illustrations for the news department, chances are it also works for the promotion department as well, requiring quite sophisticated types of equipment.



Above: Lee Klaus of WSAW created the background and leaking drums for this image on the 3M BFA paint system. The ISI 903 switcher added the multigeneration look on the lettering, produced by a hot press.

Center: A graphics artist at WFAA drew this image on the station's Quantel Paintbox.

Below: Senior designer Warren Lamm of the KRON Digital Design Group composed this news box graphic on the Aurora 100 system.



Designer Ron Lang creates whimsical weather graphics on KRON's Aurora.

In-house graphics on the rise

The growing prevalence of in-house graphics was illustrated by a readership survey recently conducted by *BM/E*, in which 70 percent of respondents indicated they used an in-house graphics department for some or all of their graphics needs. In another *BM/E* survey, 23 percent of television station respondents indicated they already had an art/paint system costing \$30,000 or more, while an additional 23 percent said they intended to buy such a system within the next 12 months. Fifty-three percent owned a character generator with graphics capability, and 74 percent had at least one channel of digital video effects.

Setting up for in-house graphics, however, involves more than just specifying equipment—although that vital and sensitive task itself can make or break the operation. Before selecting equipment, it's essential to define exactly what capabilities are needed and how the different pieces will interact. At the same time, the station must determine how the graphics operation will fit into its day-to-day routine. Will it be a separate department or part of another? Who will be responsible for scheduling, for running the equipment, for maintaining an overall look? What percentage of the station's graphics capability will be devoted to news and other departments? How will the station remain state of the art in the face of constantly changing technology?

Different stations, of course, have resolved these questions differently, according to their size and their own competitive needs. WSAW-TV, Wausau, WI, moved into electronic graphics about a year ago with the purchase of an ADDA still store and a 3M BFA paint system. Although the station is in a small market, it covers a large area in northern and central Wisconsin and produces two daily newscasts, at 6:00 and 10:00 p.m. In addition, its

Forward Services department does a lot of outside commercial production.

According to production manager Bruce Sunde, the still store "has virtually replaced all of our slides." It is used both for production and for on-air, with one control unit in the art room and another in the control room. In a pinch, the control room can take over the still store channel in the art room if a two-channel system is needed for air in a hurry.

Other graphics equipment includes a Grass Valley Group 1600 switcher, an ADDA PR-2 digital effects system, a Sony BVE-3000 three-machine editor, and three one-inch decks (two RCA and one Sony). All the equipment is also used by Forward Services for its commercial work. "It takes a lot of scheduling, but it works," Sunde notes.

WSAW's graphics setup was designed by VP operations Don Cochart and creative services director Lee Klaus. According to Klaus, the station spent close to \$200,000 for the still store and paint system. A Chyron IV character/graphics system will soon replace the station's Chyron III, bringing the budget closer to \$250,000. The graphics equipment is housed in its own specially designed room, along with a graphics camera and stand and an ISI switcher. An ADDA PR-2 digital efx unit is located in the control room, but its PR-1 controller is in the art room.

Major change in operations

The switch to electronic graphics has entirely changed the way WSAW's art department works, according to Klaus. In the past, he notes, "we'd do maybe one new graphic a week—now we do maybe 20 a day." The still store has allowed the station to move away from the generic slides that it relied on toward more specific news graphics. In addition, Forward Communications has an increased workload and improved graphics quality. To handle the additional work, the station has added a full-time graphic artist and a part-timer to the original staff of two artists.

"We've had the feedback, both by letter and phone call, on the improved look of our news graphics," Klaus says. "Also, it's really increased our speed, both for commercial and news production. We can take care of that late-breaking story, get out that late commercial, and still have it look good. Our overall image has definitely improved."

The improvement process is continu-

ing as the station currently remodels its control room and mulls future equipment purchases. Under serious consideration now is a step up to the new 24-bit 3M/Artronics paint system, an extension of the eight-bit BFA. After that, however, the station will probably concentrate on getting the most out of what it has. "In our size market," Klaus admits, "we really don't need any more."

Double-fisted efx

The setup at KPRC-TV, Houston, is significantly more elaborate, befitting the station's larger market. Besides a Quantel Paintbox, purchased about a year ago, the station has not one but two Ampex ADOs, two Ampex production switchers, an ADDA still store, and two Chyron IVs with the MGM option. This equipment is shared more or less equally by production and news. One graphic artist works full-time on the Paintbox, with two or three part-timers working the evening shifts.

According to producer/director John Burkhart, its greatest utilization is in conjunction with the ADOs to manipulate titling and add perspective, skew, and other effects.

Because of the station's large commitment to graphics, it has two production control rooms; hence the twin production switchers and ADOs. Six months ago, the station added an Ampex combiner that composites the key signals from the ADOs so that the combined output can appear at either ADO input on the switchers. This allows the signals to be programmed so that either ADO can pass over the other as desired. Because priority is not fixed, the combiner gives the graphics department more flexibility. In addition, one of the keys can be made transparent. "It's very nice for doing elaborate moves," Burkhart says. "If we had a third channel, we could generate a cube."

According to Burkhart, the Paintbox has revolutionized graphics production at KPRC. With the conventional art techniques the station used previously, artists' creations were subjected to so many technical processes before airing that they ended up as pale imitations of the originals. "With the Paintbox," Burkhart asserts, "what you see is what you get." He calls the Paintbox "the greatest invention to come along in television in 20 years."

"When you put the ADO together with what the Paintbox can do, it's phe-

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WFAA has a Quantel Paintbox and two-channel Thomson Graphics Vs.

nominal . . . Yet they're only as good as the person using them." At KPRC, the artists operate the Paintbox, although initially this created some friction with the engineering department. Using an art system "takes an artistic bent, an eye for design," insists Burkhart. The ADOs are operated by the directors, who do their own on-air switching.

Burkhart urges anyone setting up a graphics operation to consider carefully all the monitoring and peripheral equipment needed. For example, a graphics center must have a routing switcher for access to signals from the control room and the still store. Both color and monochrome monitors are needed, the latter for checking luminance separation. Also, the artist may need a vectorscope and oscilloscope "to see what the signal really looks like." A live camera is needed to capture artwork, along with a 3/4-inch or half-inch VCR. "Having these tools at hand is essential," according to Burkhart. Because KPRC neglected to write peripherals into its Paintbox proposal, it wound up significantly over budget.

Gradual growth

Another Texas station, WFAA, Dallas, was a pioneer in electronic graphics back in the mid-1970s when it installed an electronic character generator from Thomson-CSF. Later, in early 1981, the station installed what assistant CE Bob Turner believes was the first Vidifont Graphics V system in the U.S. A year later a second channel was added, then another two-channel Graphics V for a total of four channels. "Often we work on all four at once," Turner says.

Since then the station has continued to expand its graphics capabilities, adding a Kavouras Triton X weather computer with a 64-color palette, anti-aliased maps, and animation capability; a Quantel Paintbox, purchased last November; and a Quantel DLS 6000 still

store with eight disk drives, which may be the largest system in the country with a 6000-field storage capacity. Two production studios each have a two-channel Grass Valley Group Mk II DVE; one of the studios also has an Ampex ADO, used primarily on-air but also for quick, on-the-fly graphics production.

Eighty to 90 percent of WFAA's graphics production is for news, the rest for promotion and a small amount of commercial work. Graphics is a separate department within the art department, headed by art director Al Beutler. This arrangement insures a consistent overall look to the station's graphics. Electronic graphics supervisor Lillian Gonnell has a staff of four people and reports to Beutler. The graphics staff has grown along with the equipment. According to Turner, "This equipment is very expensive, and if you want to get value out of it, you must hire good people."

The graphics room itself was built around 1982, as part of a total station remodel. It's a sizable, custom-designed room adjacent to the art department with sliding glass doors, overhead lighting, and full power requirements. Housed in the room are the two Graphics Vs, the Paintbox, and one still store station (of the four at WFAA). An Ikegami ITC-730 resides on a camera stand over a light table.

For WFAA, setting up the graphics department "has been a long process. We're buying stuff that was right on the edge of technology." Today, it would be easy for any station with a million or so spare dollars to put together an equivalent system, but at WFAA the pieces of the puzzle arrived one at a time, hot off the drawing boards. Careful planning has resulted in a proper and effective fit.

Great leap forward

Electronic graphics became a way of life five years ago for KRON-TV, San Francisco, when the station purchased an Aurora art/paint system. Now, the station has enhanced its capabilities with the purchase of a Cubicomp PictureMaker 3D animation system.

According to KRON's design director, Judy Rosenfeld, the Cubicomp's full 3D modeling was a major reason for the purchase. "We'll be able to do a lot more sophisticated work in-house," she explains. "It will be used for everything." The Cubicomp will also augment certain features of the Aurora and

expand the number of people that can work on different projects at once.

To make full use of the PictureMaker's animation abilities, the station has hooked it up to a recently purchased Sony BVH-2500. This allows them to load an animation program in the evening and let the Cubicomp dump the finished animation into the BVH-2500 overnight.

The system "is tailored to our needs," Rosenfeld says. "It'll be ideal for us and an ideal way to get into 3D graphics." As a plus, Cubicomp has made KRON its Beta site.

Although the PictureMaker hasn't been used much yet because of its newness, the Aurora sees extensive daily use for news, animations, animated opens for documentaries, promotion, and programming. "We've literally designed whole programs that have been complemented visually with the Aurora," says Rosenfeld. "We use it literally for all our on-air."

KRON's design department, headed by Rosenfeld, includes an art director, print designer, five computer graphics designers, and a scenic designer. The department is responsible for computer graphics, print graphics, and sets. It works in two shifts per day, starting as early as 6:00 a.m. and going until 11:00 Monday through Friday, with Saturday and Sunday shifts as well. All work is for KRON's own air, and at least 50 percent of the electronic graphics work is for news.

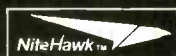
Graphics has its own area, which houses the Cubicomp, a Sony BVH-2500, a Chyron IV, and a terminal for the station's Basys newsroom computer so artists can directly access stories being written for the newscasts. The station also has a Quantel still store system.

Despite its impressive equipment roster, however, KRON still goes to outside houses to augment in-house graphics with ADO or Mirage effects. (The station's own NEC Optiflex system is also used for perspective and efx.)

Rosenfeld explains, "We have everything we need except a switcher," which will be acquired next year to interface the Chyron with the Aurora and the Cubicomp so they can build and layer graphics and dump to the recorder. "With that, we'll be self-contained with no need for extra control room time." She adds, though, "That never will take away from wanting to go to a production house or control room to augment animation."



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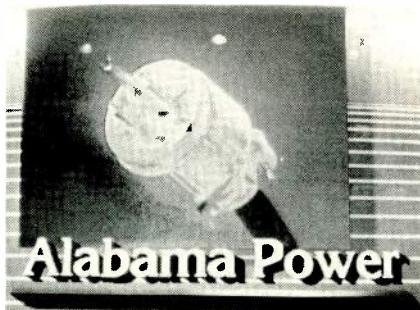
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WAKA's artist "solarized" video of this plug with the Abekas efx system.

Dual departments

New York independent WPIX-TV is "still in a transition stage" with electronic graphics, according to engineering VP Bob Murch. In spring 1983, the station acquired a Dubner CBG-2 paint system, which is gradually working its way into the station's look. The station uses the Dubner primarily for news and easily generates such complex images as bar graphs with text and graphics in as little as five minutes. "We're trying to grow into electronic graphics," Murch says. "We're starting to use it more and more."

WPIX has two separate graphics departments, one strictly for news, the other for promotion, IDs, and community affairs. Equipment for the two departments is largely separate, although the Dubner and the station's two Chyron IVs are shared.

Physically, there are four rooms: a news graphics room, station graphics room, Dubner room, and Chyron room. About six people work in news graphics, about seven in station graphics, plus seven or eight Chyron operators. Both engineers and graphics people are trained on the Dubner, according to Murch, who adds, "For the money, this was the best all-around system." He hopes to add a still store fairly soon, and feels that eventually the station will probably get a Quantel Paintbox.

In setting up a graphics operation, Murch advises, "carefully decide what you want the graphics to do, who's going to run it, and what sort of things you want produced." While separate departments for news and station graphics may ease scheduling problems, Murch cautions that a station may risk losing a uniformity of look; it's important to stay on top of this, he notes.

Best of both worlds

Two graphics departments are also the rule at KTTV, Los Angeles, which

purchased a ColorGraphics ArtStar II paint system early in July. Art director August Santistevan heads the station graphics department, which does all print and electronic graphics for on-air, sales promotion, research material, brochures, and the like; a separate department, headed by news art director Peter Graziano, concentrates on news graphics.

The station's Via Video graphics system and ColorGraphics LiveLine weather system (which has limited paint capabilities) are located in the news graphics studio, while ArtStar II is in the station graphics department. The station has two still stores, a Harris IRIS and an ADDA, both used in graphics production. ArtStar is also tied into KTTV's CMX editing rooms, where the IRIS still store is located along with GVG switcher, ADO, two-inch tape machines, and Chyron IV. The station graphics department also has a color camera and stand to capture and digitize still images.

According to Graziano, the medium-resolution Via Video system, which cost around \$50,000 when the station purchased it a few years ago, "is very adequate for our needs." Because news rarely uses full-screen graphics, true high resolution is unnecessary. "In a way, you're reducing it to high resolution," he explains.

"Strong design and color is more important than resolution," Graziano adds. "The resolution gets taken care of when it gets reduced down . . . It serves its purpose well and saves us the grief of having to share time."

Graziano's department produces a variety of graphics, including graphs, news boxes, and type. The LiveLine weather system is used primarily by the weather person, who changes the maps and fonts every day. According to Graziano, the station settled questions of jurisdiction by having artists operate the machines when they function off-line and engineers operate them—under artist supervision, if needed—for on-air use. He foresees no new equipment purchases in the next year or so, and is not even sure he'll raid the station graphics department for time on the ArtStar. "Getting time on a computer is a major problem," he points out. "This way we have the best of both worlds."

Back in station graphics, Santistevan says his department has already begun to create program opens and other art with the ArtStar II. He anticipates that within a year the new system should

virtually eliminate the need for out-of-house animation, which the station currently relies on. With the added workload, Santistevan hopes to increase his staff by 50 percent—in other words, add a third person. (News graphics is also a two-person department.) Besides Santistevan and his assistant, the department regularly hires per diem artists.

David vs. Goliath

A small station in a competitive market, KMST, Monterey, CA, competes with strong stations in nearby San Jose and Salinas. When the station built a new studio about a year and a half ago, it decided to beef up its image with an NEC E-Flex, purchased along with an Ampex 4100 production switcher and three VPR-80 one-inch VTRs. "We use it heavily in production and live newscasts," chief engineer Ken Warren says of the E-Flex. "We're always squeezing and moving things around." The E-Flex is also used for commercials and station promos. "We'd be lost if it would break down. We use it in practically everything we do." The station's Thomson-CSF Vidifont character generator is used in conjunction with the E-Flex.

News and production at KMST have separate studios but share a control room that houses the switcher and E-Flex controls. Because the station's three daily newscasts are fixed, production is scheduled around them, according to Warren. About 35 percent of the production department's work is for news, he estimates.

Since adding the new equipment, the station is gradually increasing its production staff. According to Warren, however, the major benefit has been to move the station into a stronger competitive position. "It's been paying off—ratings are up," he notes. "We've become more competitive, more state of the art." For the future, Warren says the station is considering the purchase of a still store and an electronic paint system.

Electronic expansion

Another small-market station, WAKA-TV, Selma, AL, also added its graphics department as part of a major station expansion that not only quadrupled the size of the building but increased the station's coverage from seven counties to 22. While the station has separate departments for news graphics and commercial production,

Ampex versatility, long appreciated by over 6100 users of the famous Ampex VPR-2, is part and parcel of its successor, the new VPR-6. But the VPR-6 brings you state-of-the-art performance and even more flexibility with multi-point search-to-cue, comprehensive integral editing, variable speed True-Frame™ playback, stereo audio, serial communications, and precision handling

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they share the same equipment, including an Ampex AVC 23 Series production switcher, an Abekas A42 still store and A52 efx system, and a Chyron VP-2 character generator.

Production manager Walter Bridges estimates that perhaps 30 percent of the system's time is devoted to news and 70 percent to commercial production, with the departments sharing responsibility for promos. With the system in use from 6:30 a.m. to 11:00 p.m. most days, scheduling can be tricky. In general, commercial production is in charge until 3:15 p.m., and may sneak in an extra hour between 7:00 and 8:00 p.m.

"There's been a tremendous increase in the quality of our commercial production since acquiring this equipment," Bridges states. The station has been able to cut down its reliance on art cards in favor of the speed and flexibility of the character generator, switcher, and still store. "In my opinion, the electronic still store is the greatest thing that ever happened to commercial production," Bridges continues. "It's hard to believe we ever lived without it." As the system becomes more fa-

miliar to the staff, its use will probably increase even more.

"When we get more established and can schedule more time for news production, we will start building graphics with the electronic still store," Bridges comments. He is especially intrigued by the A42's ability to layer stills one on top of the other. While the unit can layer up to 16 images, Bridges says he'll probably stick to three or four most of the time to avoid over-complexity.

Before the upgrade, WAKA relied on generic news graphics purchased from an outside company, which were mounted on slides and used as chromakey backgrounds. A Chyron VP-1 generated full-page graphics in the middle of stories, but news preproduction was very limited. The new, more professional look apparently has already been noticed by WAKA's main competition, a well-established VHF station. According to Bridges, before the WAKA upgrade, the other station had had no serious competition for some time and "got real relaxed" about its on-air image. Now, he says, that station is moving to

improve its own look.

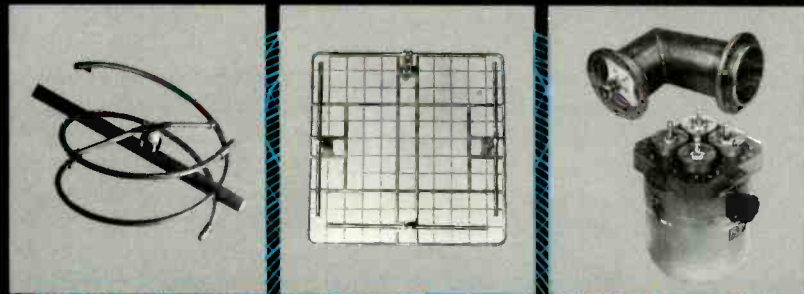
Bridges is pretty pleased with WAKA's current graphics setup, although he does plan to upgrade the character generator with either a Chyron VP-4 or a Thomson Graphics V. For now, however, the system is adequate for the station's needs. What Bridges would particularly like to see, however, is an extra commercial production shift, from 11:00 p.m. to 7:00 a.m., to give news production time to do an even better job.

The impossible dream

Wouldn't it be wonderful to have an unlimited budget and all the equipment you ever wanted? No, that's not really the case at WRC-TV, the NBC O&O in Washington, DC—though it may seem that way to many envious smaller stations. Besides being in one of the country's largest and most competitive markets, where high equipment budgets and sleek graphics are expected, WRC, like NBC's other owned stations, benefits from all the "extra" equipment left over every four years from the network's political convention

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and campaign coverage.

The station's most recent graphics addition—a Quantel Paintbox—was acquired in just this way. According to Harris Sullivan, engineering manager in charge of graphics at the station, the network budgets heavily for its political activity arm each four years. Rather than warehousing all the new equipment after the election—and risking possible obsolescence—the network allocates the equipment to its O&Os. “That’s how we first got into EJ in 1976,” Sullivan recalls, “This year, we got a Paintbox.”

To get the most out of the device, WRC located it between its two graphics compose rooms, either of which can access it. The Paintbox, in turn, can access any still in the system.

Each graphics compose room contains a camera, a GVG 1600-1L 10-input production switcher with one mix/effects bank, a digital efx unit (one room has the DSC Illusion, the other ADDA’s VIP), and a control panel for the six-drive ADDA still store. (The third control panel is in the control room for on-air use.)

In addition, the graphics control

rooms each have a dedicated Chyron II character generator, plus proc amps and color correctors. “We believe that what you record on disk is what you’re going to get back, so we do all our correction of levels and such while we’re making the graphics,” Sullivan explains. The station also has a ColorGraphics LiveLine IV system.

As one would expect, most of the station’s graphics work is for news. “Our primary business is news,” Sullivan explains. “We’re in the news capital of the world.” The unit also does promo and ID work, however, and has produced specialized station IDs for particular purposes: for example, an animated Father’s Day logo, created on the Paintbox. At this time the station does only limited graphics for local, non-news programs, Sullivan adds, although the station’s efforts in that area—especially for children’s programming—are increasing.

Even with its sophisticated capabilities, WRC has its eye on the future. Spurred by network headquarters, the station is looking to upgrade its graphics compose rooms to the point where they can generate complete graphics

packages onto tape for insertion into shows. (Currently, the pieces produced in the rooms must be taken to a control room for final production.) To this end, the station is planning a new graphics production center that will include a three-M/E studio switcher, a computer-controlled multimachine editing system, several one-inch VTRs and a ¾-inch deck, a four-channel ADO, four more Paintboxes, a Dubner graphics system, and a couple of Cypher-type character generators. Sullivan hopes to have all the new equipment on order by the end of this year, with the aim of having the whole system up and running by this time next year.

While a setup like the one WRC plans may be beyond the reach of most stations, it illustrates one of the most important requirements for effective electronic graphics: planning. Whether a system is purchased in one package or over a period of years, whether it is massive or modest, it is essential that all the pieces function smoothly together and provide the capabilities the station needs. Glitches may be inevitable, but planning ahead will keep you moving in the right direction. **BM/E**

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The advent of satellite newsgathering (SNG) equipment has made it possible for local news to go live from locations anywhere in the country.

By Robert Rivlin, Editor

It was only seven years ago that *BM/E* published its Neal Award-winning series of articles *Broadcasting Goes Live*. The big news in our January 1979 issue was the tremendous increase in ENG microwave capabilities of trucks with transmitters capable of covering a 30-mile radius. And, with microwave-equipped helicopters and automatic tracking ground stations, stations could cover stories out to the furthest reaches of their grade C contours—50 or more miles away. There were even instances of using a microwave relay in an airplane that would circle overhead, permitting even greater range.

In 1985, there is a brand-new technology available to news directors, making it possible to cover a live story not just from 50-100 miles out, but, if the station wishes, from across the country as well. The technology is SNG, or satellite newsgathering, a new generation of highly transportable Ku-band satellite uplinks (in the case of the GEC/McMichael NewsHawk a portable system that can fit into a Lear jet) with which a station can beam a signal from anywhere in the country. Some examples of the uses of SNG are:

- During a hostage crisis, stations with local residents being held or returned could send live newscasts back home directly from the airport.
- In political situations, an SNG truck in Washington can beam back signals of the local senator or congressman being interviewed by the local reporter.
- A regional baseball or basketball playoff from an arena 250 miles away can be covered live as easily as if it were a hometown event.
- A major breaking news event 150 miles away at the state capitol can be covered live simply by dispatching an SNG truck as easily as a microwave truck used to be sent out.
- From a remote wilderness area, viewers see live images of mountain climbers or adventurers as if they were in a nearby town.
- All of this is possible now with Ku-band satellite antennas and transmitters that ride on trucks no larger than 25-30 feet and are capable of being driven to the scene or pulled behind a station's current ENG van, and set up at the site of the news even within 15-20 minutes—about the same time as it now takes to set up an ENG-microwave relay.

One of the first companies to take advantage of this new SNG capability was Conus, a division of Hubbard Broadcasting. Last May it established a nationwide network of local stations, each equipped with an SNG truck. Why has the Conus operation succeeded where several other "news exchanges" have failed (the network now numbers 23 stations)? At least in part, its success is due to the ability of affiliates to move their satellite dishes around at will, covering events in broad coverage not only for themselves, but for others in the network.

The 11 stations in the limited-partnership Conus venture are each equipped with the Conus Newstar trucks and regularly share news coverage transmitted over a Hubbard-owned transponder on the SBS-3 satellite. The Conus trucks, 23 feet long, use 2.4-meter nonfolding antennas.



KTSP, Phoenix anchors local news show live from Grand Canyon during month-long SNG odyssey using MicroLink SNG truck.

NG

Local Coverage on a Nationwide Scale



By contacting the Conus network control center in Minneapolis, any Conus affiliate has instant access to the transponder 24 hours a day, seven days a week. Transponder time, at approximately \$35 per minute (far less than standard leased transponder time), is available for both transmitting a story (either to the affiliated network or else within the station's own coverage area), or to receive transmissions from other stations. With this arrangement, it is also possible for the stations to pool their coverage on a major breaking story—or for one station in the network to ask another affiliate to cover a story for it at minimal cost.



KTSP-TV's HUBCOM-built Newstar SNG truck for Conus network participation.

The Newstar trucks, built by Hubcom, are equipped with self-contained 35 A, 15 kW generators, off-line video editing systems, and two-way communications back to the station. Each truck also has an on-board computer hooked into the control center via telephone modem.

The key to winning in SNG, says Charles Dutcher, vice president and general manager for Conus, will be service. That's why he is banking on the Conus connection above for the satellite service, and the Hubcom connection below for reliable vehicle service to keep the Newstar SNG fleet ahead. And it is also the reason that Dutcher is already predicting a shakeout among the would-be SNG suppliers.

Aside from the turnkey, one-stop shopping delivery of the SNG truck, the offer of leasing arrangements, as well as the purchase and the satellite link arrangements, Conus also provides training for SNG crews.

Florida news network

Another early leader in the use of satellites for news has been a four-station consortium of Florida stations (WPLG, Miami; WJXT, Jacksonville; WTSP, Tampa/St. Petersburg; and WFTV,

RTNDA Exhibitors

The following is an updated list of exhibitors scheduled for the RTNDA conference as of presstime. Additional companies may appear at the show.

- | | |
|------------------------------|-----------------------------|
| Accu-Weather | Local Program Network |
| Advanced Designs | MZB |
| Alden Electronics | Frank N. Magid Assoc. |
| Ampex | Mead Data Central |
| Angenieux | Media Computing |
| Asaca Shibusoku | Midwest Communications |
| AT&T | Microdyne |
| Associated Television Intl. | Motorola |
| Basys | NEC America |
| Bonneville Satellite | Newslink |
| Broadcast Microwave Services | Nurad |
| Broadcast Systems | Panasonic |
| Centro | PEP |
| Chyron | Photo Store |
| ColorGraphics | Prijatel Productions |
| Columbine | Professional Video Services |
| Comprompter ENR | Q-TV |
| Comrex | Quantel |
| Christie Electric | RF Scientific |
| Crosspoint Latch | Research Technology Intl. |
| DWJ | Scientific-Atlanta |
| Dalsat | Shure |
| Data Communications (BIAS) | SJOCOM Telesound |
| ENG Corp. | Sony Broadcast |
| Eastman Kodak | Soundtrack Music |
| Environmental Satellite Data | SPR Services |
| Don Fitzpatrick Assoc. | TelePak San Diego |
| Fujinon | Telescript |
| GEC McMichael | Television Engineering |
| G&G Designs | Terminal Systems |
| Gray Communications | Thomson-CSF Broadcast |
| Group W-Newsfeed Network | Tuesday Productions |
| The Graphic Express | TUI Computers |
| Heil-Brice Productions | Ultimatte |
| Hubcom/Conus | United Technologies |
| Ikegami | VTS Production |
| Ivanhoe Communications | WSI |
| Jefferson Pilot Data | Winsted |
| Kavouras | Wold Communications |
| LBS Communications | Wolf Coach |
| Listec | Zephyr Weather Information |



Dalsat transportable Ku-band uplink for Florida News Network. The 4.5-meter dish folds for storage.

Orlando) who have banded together to form a statewide SNG network to exchange daily news.

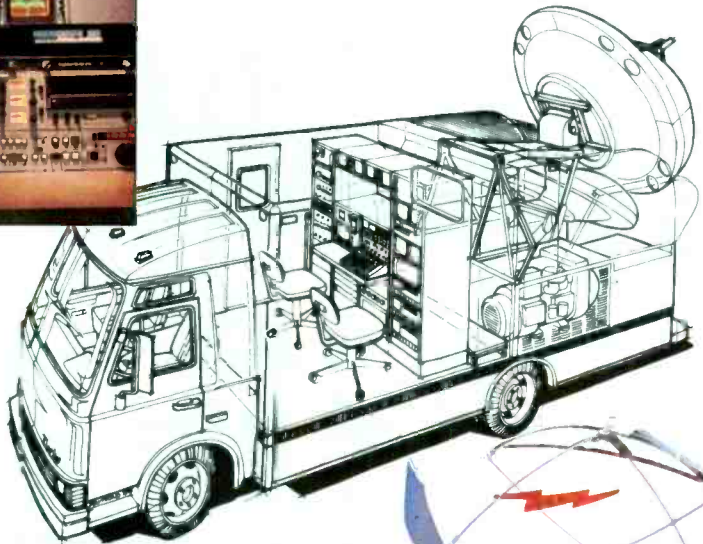
According to Steve Wasserman of WPLG, "Among the four major Florida markets, demographics are highly fragmented. Because the state encompasses a diverse population of native Floridians and immigrants from other states and countries, each market has entirely distinct characteristics. However, common problems of taxation, environment, education, health, government, and spot news extend across all demographic segments. The FNN is designed to more effectively

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cover news of universal interest.”

The need for effective news coverage of a local, regional, and national scope led the four Florida stations to identify three key newsgathering objectives:

1. Increasing newsgathering effectiveness. To improve the timeliness, subject matter, completeness, and reliability of reporting, the stations needed an extremely portable distribution system that could produce high-quality video.

2. Expanding to regional coverage. By interconnecting the major Florida markets on a regional basis, news directors broadened the range of programming alternatives available to each station.

3. Spreading investment and risk. The network gains economies of scale by sharing variable costs (personnel and operators) associated with highly labor-intensive on-the-spot news coverage.

The operation, the first statewide network of this kind, will cost approximately \$2 million to start up. This figure includes a \$300,000-\$350,000 transportable uplink-equipped truck at each station, equipped with a 4.5-meter Ku-band antenna. (The decision to go with folding 4.5-meter antennas as opposed to the smaller 2.8-meter antennas on the Conus trucks was made because Florida is right at the edge of the Ku-band satellite coverage area, and it is hoped that the larger dish will provide more reliable transmissions.) Startup costs also include a downlink at each station, plus leased transponder time on the GTE Spacenet satellite. (In all, six stations nationwide are using the Dalsat/Spacenet arrangement.)

The 28-foot SNG-25 trucks were designed and constructed by Dalsat, its first entry into the truck-based transportable uplink business. The trucks use satellite equipment built by Microdyne. In addition to the collapsible, folding antenna, trucks are also equipped with ¾-inch editing capabilities. By editing material prior to transmission, the operation can save actual uplinking and downlinking time—more costly to the Florida network than to the Conus consortium since it must book feeds on the GTE Spacenet satellite.

Another major feature of the SNG-25 trucks is their elaborate communications system. Each unit has two Dalsat single-channel-per-carrier (SCPC) circuits, which allow station-based producers to give off-air instruc-

RTNDA Conference September 11-14, Nashville, TN

The following is a slightly abbreviated version of the conference schedule.

Wednesday, September 11

Morning Golf and Tennis Tournaments
6:30 p.m. Welcoming Reception and Exhibition Grand Opening
7:30 p.m. RTNDA Awards Banquet
Address: Dan Rather, CBS News

2:00 p.m. What's Working Elsewhere in Radio News Technology
So You Want to Manage a Radio Station
The 50 Percent Solution: Marketing Your TV News Product Effectively and Efficiently
The Other Side of the Fence: ND and GM Points of View
Jack Daniel Event (Opt.)
9:00 p.m. Grand Ole Opry (Opt.)

Thursday, September 12

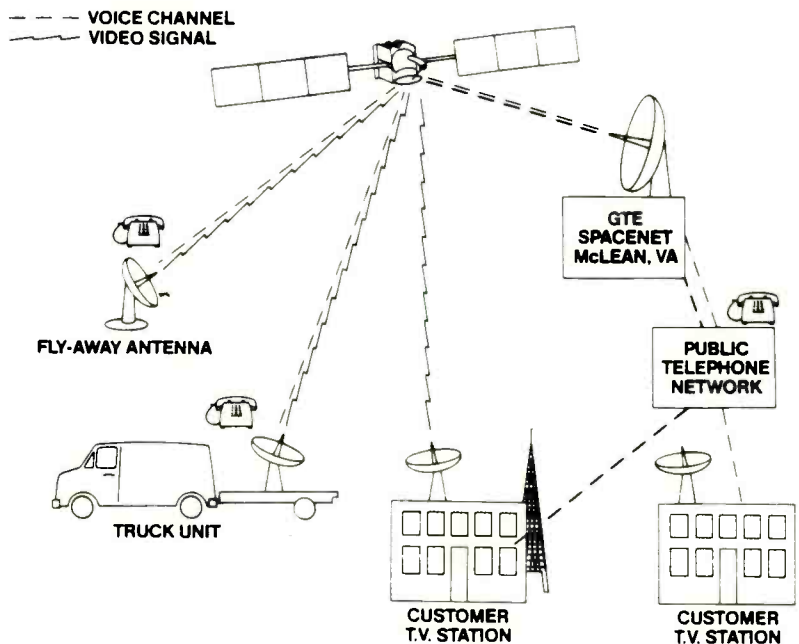
9:00 a.m. Exhibition Opens
9:30 a.m. Opening Remarks: RTNDA president Lou Adler
9:40 a.m. Welcome: The Mandrell Sisters
9:45 a.m. Keynote Address: Peter Jennings, ABC News
Noon Luncheon
Lifetime RTNDA Membership Presentation to Jeremy Levin, CNN
Speaker: Garrison Keillor, "The Prairie Home Companion"
2:15 p.m. Presenting Radio News
Doing CHR/AOR News
Newswriting
International Terrorism and the Media
3:30 p.m. Management Workshop
6:30 p.m. Music Village Outing (Optional)
7:30 p.m. Dinner/Cruise (Opt.)

Saturday, September 14

8:00 a.m. Exhibition Opens—Continental Breakfast
10:00 a.m. The Radio News Idea Exchange
Whose News Is It?—Electronic News Releases
11:30 a.m. Lunch with the Exhibitors
12:30 p.m. A Resource Center: Meet With Top Women and Minority People in News Management
2:00 p.m. Exhibition Closes
2:00 p.m. The New Challenges and Responsibilities of the American Press—Jack Anderson, syndicated columnist
3:00 p.m. Reading a Radio Ratings Book
How to Make Radio News a Profit Center
How to Get Your Story Covered in Timbuktu and Remain Within Budget
Jocks in The Newsroom: A Commitment to Sports in Journalism
6:30 p.m. Reception and Banquet: Winner of the Paul White Award, Barbara Walters, ABC News
Installation of John Spain, WBRT-TV, new RTNDA president

Friday, September 13

9:00 a.m. Exhibition Opens
9:00 a.m. RTNDA/NAB/NRBA Radio Workshop Via Satellite
What's Hot in Television News Research, Ratings and Gut Keeping the 'J' in Photojournalism
Noon Luncheon
Speaker: Jane Pauley, NBC News



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Midwest SNG unit on location with KWTW, Oklahoma City.

tions to crews in the field using IFB. One of the SCPC circuits can also be used by a news anchor to interact with a field reporter during a live remote. The SCPC permits two-way field-to-station communications via satellite, eliminating the need for conventional surface-level telephone service. There is also a self-contained telephone system, allowing the truck to communicate with the satellite control center to book the feed.

With the Dalsat/GTE arrangement, two signals can be transmitted simultaneously through any one of four GTE satellites, providing up to eight channels for transmission. A fifth bird providing two additional channels is set to be launched early next year.

As for setup time, the Dalsat 4.5-meter folding antenna requires additional effort to deploy. Dalsat claims that one man can ready the link in 30 minutes initially, and in 15 minutes after becoming experienced.

New Wold network

One of the newest SNG designs is from Microdyne, whose QuickLink was designed for use in Wold Communications' proposed Ku-band SNG operation. (Wold is expected to have an SNG network by January 1986. It is a specially designed delivery service for satellite newsgathering throughout the continental U.S. Wold transmission services will be on the RCA K-2 satellite scheduled to be launched in December—the same satellite NBC television network is to use to deliver network programming to its affiliates.)

Microdyne's QuickLink is a self-

contained unit with uplink and 3.66-meter parabolic antenna with 53 dB gain, mounted on a 20-foot double-axle trailer that can be towed behind a station's ENG van. The system is designed to make it easy for an ENG crew to set up the satellite feed. A key feature is completely automatic acquisition of the desired satellite using a calibrated satellite location memory that is on target in 10 minutes. Moreover, Quick-Link has a two-way voice-grade communications link with Wold's 24-hour network operations center via SCPC. Full setup is said to be only 15 minutes, with power supplied from an on-board gasoline generator.

Other features of the truck include three electric screw jack power leveling units, and 20-foot trailer with four-wheel independent torsion bar suspension.

Satellite systems to go

Those companies described above whose SNG vehicles are already committed to use particular SNG networks are not alone, however, in manufacturing state of the art SNG systems. Midwest Corp., one of the country's largest manufacturers of mobile production vehicles, has now gotten into the SNG race with the S-20 Ku uplink system with a 3.5-meter antenna mounted on a 22-foot trailer. The unit also houses a two-person control room with environmental conditioning containing the full complement of four equipment racks, power distribution panel, storage, etc. A 12 kW generator is also carried on board. The antenna, low noise converter, full and half transponder video re-

ceiver, and full and half transponder video filter are all from Harris. The Varian 300 TWT amplifier is used. Test and monitoring equipment is from Tektronix and Videotek respectively. With all options, the truck costs \$200,000—considerably less expensive than the \$300,000-\$350,000 models being offered by other manufacturers.

The first user of the system is KWTW in Oklahoma City, which has already covered several major news events—a tornado touchdown and a fireworks explosion—that were fed live to the CBS network. The station is also a member of the Conus partnership, and is the first station to use a non-Hubcom SNG truck for its feeds.

Indeed, the truck has done so well in its first months of operation that the station is considering purchasing another. "We are considering a second unit because we haven't seen the first one since we took delivery—it's been on the road so much," reports CE John McNally.

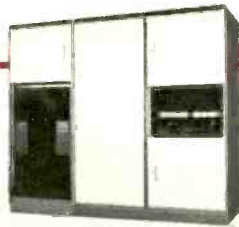
Midwest is also said to be negotiating with the Wold network to supply SNG vehicles when the news network gets going. Although Microdyne is supplying higher-cost systems for those stations who want them, the Midwest SNG truck will be available for \$100,000 less.

LB Telesystems is making an SNG truck for Comsat General, which will be leased. It has both a 2.4-meter dish and a microwave mast for terrestrial communications. It can be configured from simple newsgathering to full production with on-board editing and production switching.

MicroLink Systems introduced its SNG Series mobile, self-contained vehicle at NAB this year. It's equipped with a 2.3-meter parabolic antenna and a 600 W TWT amplifier. A synthesized video exciter allows frequency selection of all satellite transponder plans, including all full and half transponder formats. An audio subcarrier modulator is included, with room to add more. Overall vehicle length is 23 feet. Four electrically-operated leveling jacks remote controlled from inside the vehicle provide stability while in deployed position.

The MicroLink system recently got a major skakedown cruise in Arizona when it served KTSP, Phoenix, on a month-long "Celebrate Arizona Odyssey" that took the station to 29 locations throughout the state. A total of 20 anchors, reporters, technicians, and

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VIDEOSTAR EXPRESS Ku-BAND VIDEO UPLINK



A Ku-band rental unit from VideoStar, which also offers satellite time to its clients.

cant of these is VideoStar, which got started with transportable C-band uplinks. Six Ku and C transportable uplinks are available for rental around the country, and are driven and set up by VideoStar personnel at whichever location the user desires. Most often the trucks are brought into play to cover stories for the networks, including sports telecasts. VideoStar provided Ku-band coverage for both NBC and CBS of the Hurricane Diana strike in North Carolina, reported in *BM/E's* November 1984 issue.

Its considerably larger Ku transportable rigs feature five-meter folding antennas that can be set up in 30 minutes by a one-person crew. In addition to its SNG equipment, VideoStar also maintains a nationwide network of downlink facilities, and acts as a broker for satellite time.

The oldest company in the transportables business is Compact Video, whose C-band transportable uplink business was combined with Netcom late last year. This was the transportable C-band system used to provide live coverage of the Lost Arrow Yosemite Park mountain climb earlier this sum-

crew traveled with the MicroLink SNG truck, and provided coverage from two locations a day for the 5 p.m. and 10 p.m. newscasts—a total of 42 locations in all. In addition to the regular newscasts, the station also broadcast six spe-

cial based on the journey, including some in prime-time, on a variety of topics of special concern to the state.

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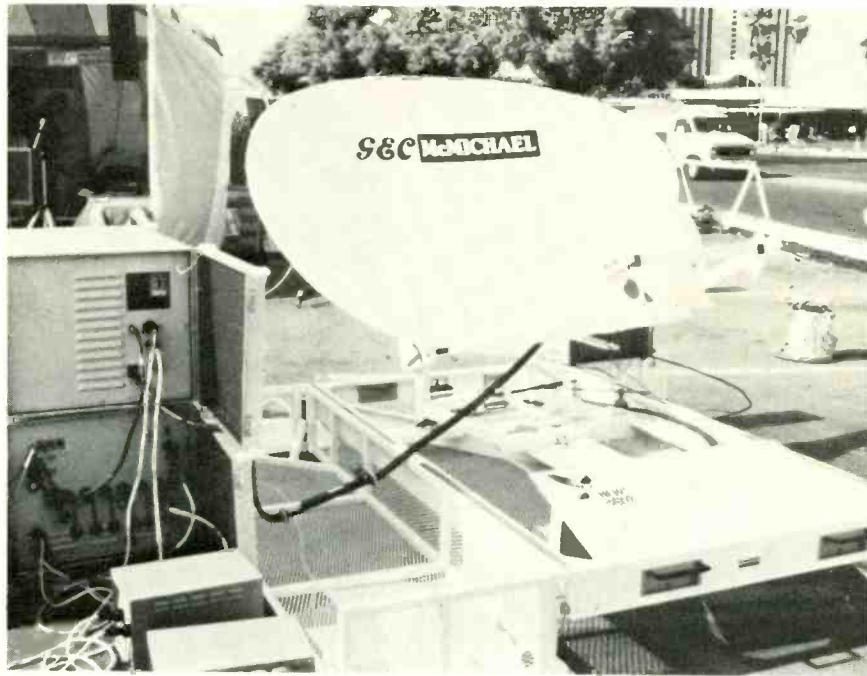
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GEC/McMichael NewsHawk portable satellite uplink demonstrated at recent NAB.

mer by ABC Sports (see *BM/E*, July 1985, p. 12).

SNG "in a suitcase"

Perhaps the most innovative SNG

hardware of all comes from GEC McMichael, who at NAB this year unveiled its NewsHawk satellite earth terminal that is designed to fly away rather than drive away. NewsHawk features a

2x1-meter elliptical antenna which has a transmit gain of 45 dBi and receive gain of 43.5 dBi. The antenna complies with the 29-25 sidelobe specifications.

The system, antenna and all, is small enough to be carried in a light aircraft such as a Lear jet or helicopter, checked as baggage on a commercial aircraft, or packed into a station wagon. The entire system is housed in three flight cases when configured for conventional analog transmission, and can be handled by a two-person crew. More demanding applications may require use of GEC McMichael's digital video compression equipment which operates over a variable range of 1.5 to 8 Mbits/sec. The video compression equipment is carried in an additional flight case.

Despite its compact size, however, the antenna is large enough to provide an aperture in compliance with two-degree satellite spacing. According to McMichael, the elliptical aperture meets these two requirements.

This is the SNG system which CBS has chosen for its Rapid Deployment Earth Terminal (RADET) program, designed to transport a news crew with live capabilities anywhere in the world.

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Bob Poe, General Manager
Florida Network



"We're a regional radio network distributing news, sports and information to nearly sixty affiliates throughout Florida.

"We switched to satellite distribution for the same reasons so many others have: It costs less, is more reliable, and provides higher quality than land lines.

The Microdyne equipment sold itself

"When it came time to buy the hardware, we chose Microdyne over all the others because they understood our problems and offered the best solutions. Their equipment sold itself, really. It's the most flexible system available. The downlink demodulator can accommodate any transmission format currently in use.



The Florida Network's permanent uplink in Orlando distributes programming via two SCPC carriers on Westar III.

"That's a big plus to us, and to our affiliates, because it means greater programming flexibility.

Turn-key system put us on the air in less than three months

"Another point in Microdyne's favor was their ability to provide a complete turn-key system in a minimum amount of time. They had us on the air in less than three months. Some of the other companies were giving us lead times of 180 days and more.

Engineers praise the system

"Of course our engineers were heavily involved in the decision to buy. They're aware of Microdyne's reputation and they highly recommended the system. And I guess the true test is that after nearly a year of hard use, they still praise the equipment.

Expands our broadcasting opportunities

"As I said, we went to satellite distribution for the cost, reliability and quality. But we've found that it has really expanded our opportunities as well. The transportable uplink was intended to serve just as a backup, but it has been kept in constant use uplinking special events over our

second transponder channel. We get inquiries from broadcasters all over the country who want to lease it from us. That's providing extra income.

"And that's just one example. We can serve as a carrier for almost any kind of information. So there are many more possibilities open to us beyond the traditional role of broadcasters. And Microdyne has the ability to help us explore these new areas, too."

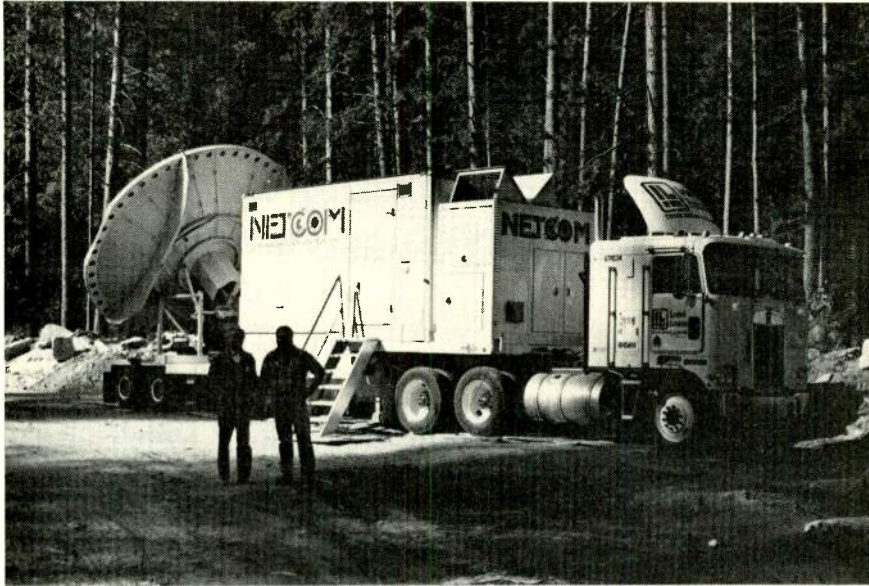


The Network's transportable uplink, also from Microdyne, is in constant use carrying sports and special events over a second channel.

To find out more about Microdyne satellite radio systems and downlink components, call our sales department at (904) 687-4633.

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Telecom Madlay earth station in London. From there, conventional satellite transmission carried the signal across the Atlantic.

Thus, within a very short time span, the concept of taking a dish out into the field and using the previously suspect Ku-band to bounce signals back to a station or stations has become an accepted technique. Little wonder there's now more competition on the SNG roads. Not only are the satellite equipment and satellite service companies joining the parade, but the established ENG truck designers are hitching a ride.

There are still some unresolved issues. These include: the optimum size of the dish, wind load capability, sidelobe performance, foldable antenna or not, best means of intercommunications, and assemble-disassemble times (you get some tricky quotes on this point). Operating costs is another hazy issue at this point.

But the questions are ones of small detail considering the enormous impact that SNG will have—indeed is now having—on the business of gathering news. **BM/E**

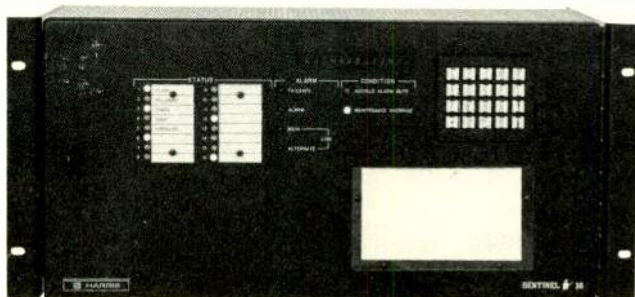
Netcom C-band uplink in Yosemite Park for ABC live telecast of *Lost Arrow* climb.

RADET will use the SNG terminals for transmit-only operations, with a separate voice/data channel used for communications between the earth station team and network HQ.

NBC is another fan of the GEC "fly-away" system, and used it recently to cover the tenth anniversary of commu-

nism in Vietnam live for the *Today Show* and *NBC Nightly News*. The uplink, used by NBC, BBC, and ITN, was set up in Ho Chi Minh City and accessed the Indian Ocean Intelsat bird. The signals were then cross-strapped on the satellite (converted from Ku- to C-band), and received at the British

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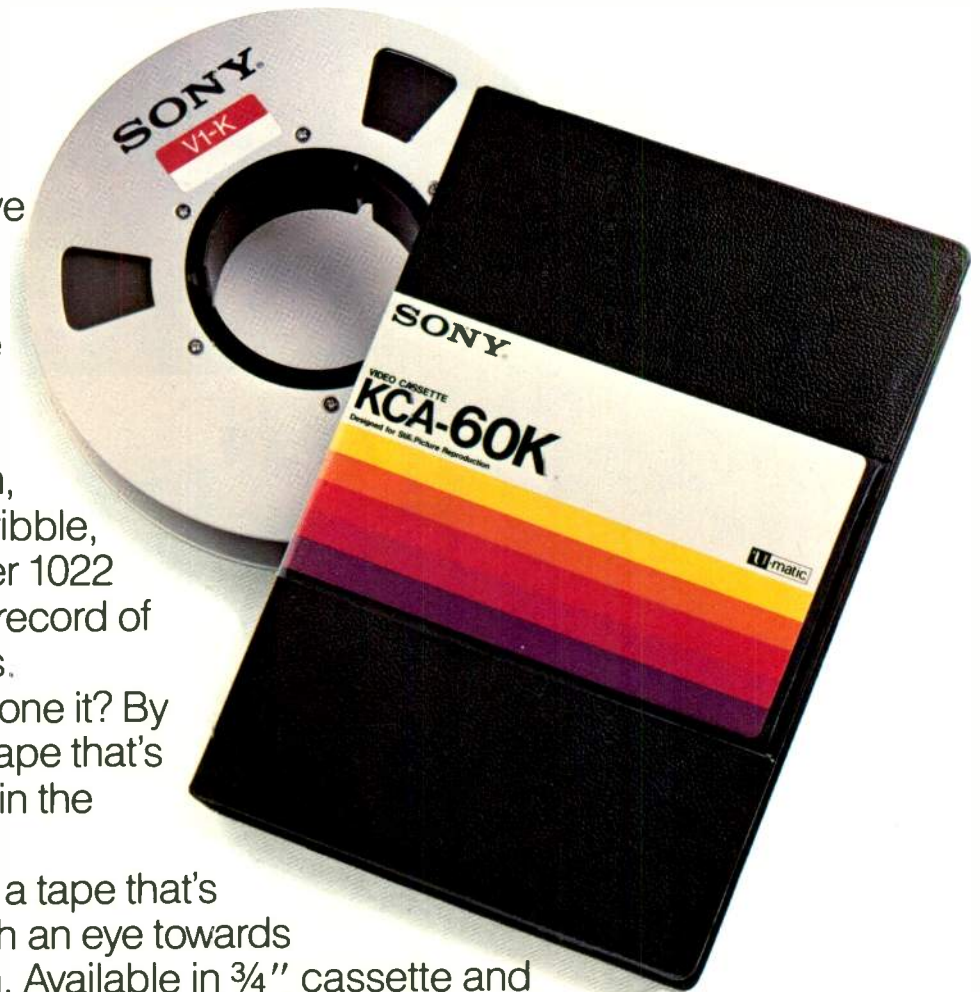
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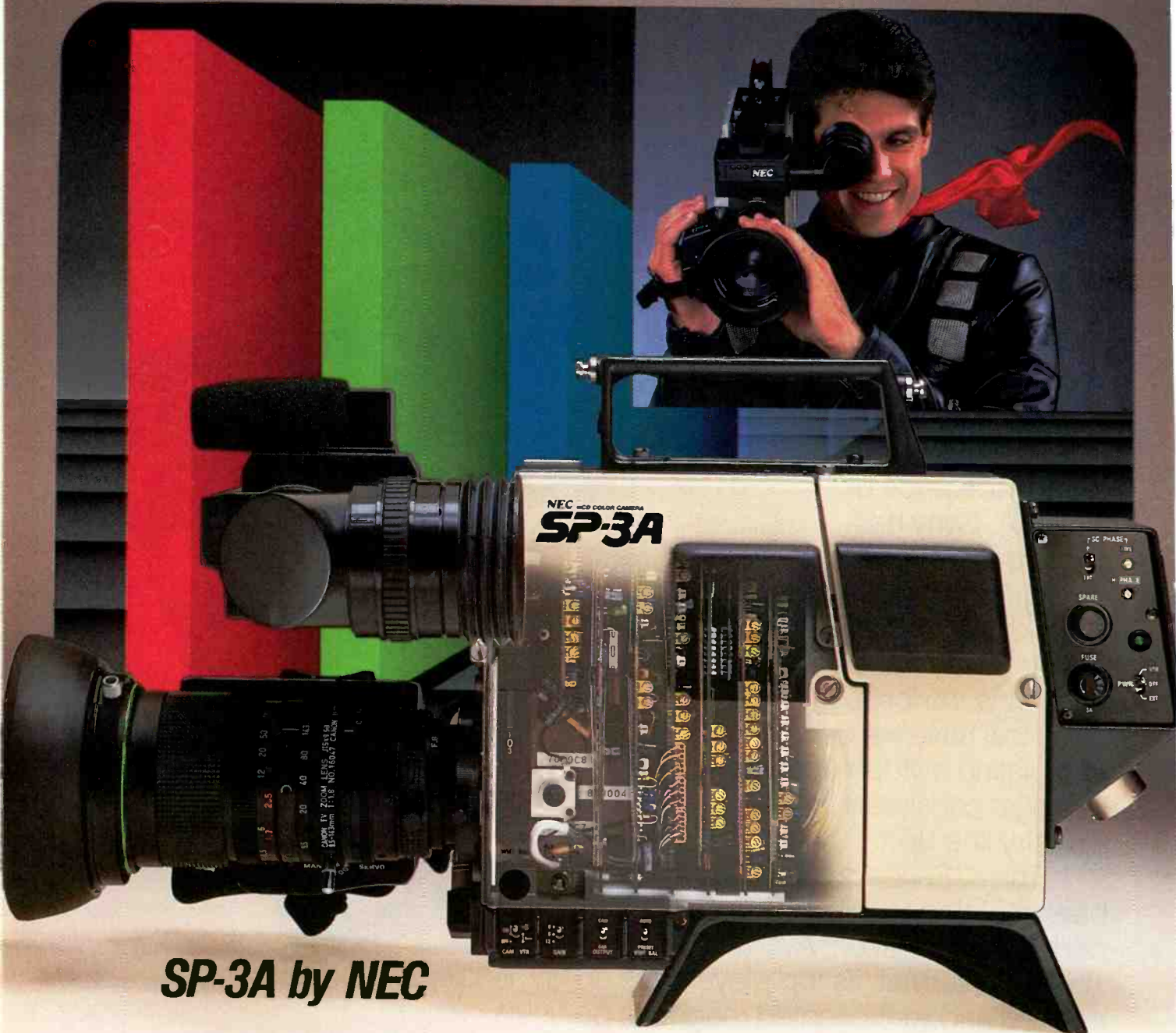
Then, to ensure that there be no technical fouls, Sony subjects the K-Series to pre-game check-ups lasting over 1000 hours.

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New Technology for SPORTS PRODUCTION



With new techniques for covering sports—everything from moveable overhead cameras to crystal-clear slow motion to image stabilization—local stations and networks alike are discovering innovative ways to excite viewers.

By Judith Gross, Associate Editor

Engineers in TV sports like to talk about the discovery of the instant replay. It's credited to any number of technicians at many different stations. But the story generally starts with a game such as football, and a sports announcer who liked a particular play so much that he asked the engineers if the folks at home "could see it again?" The answer, the story goes, was that an engineer rewound the tape and aired the few seconds of play again. And it has been used ever since.

TV sports enthusiasts, if they think about it at all, probably take instant replays or slow-motion replays for granted. But there's more at stake than viewers. Sports events currently attract some of the biggest advertising dollars in TV today, and small stations right up to the major networks are currently locked in hot competition to find newer, more exciting angles and more



Top: NBC used 12 cameras for All Star coverage in the Minneapolis Metrodome.
Bottom: All Star Game coverage was directed from NBC's control truck N-1.

spectacular footage to outdo each other.

The latest offerings in sports video can be categorized in two ways: those that seek to achieve dramatic or unique effects, and those that seek to overcome some problem inherent in following sports play. And even those innovations that offer dramatic footage are in some way trying to overcome obstacles in shooting sports events. Slow-motion systems are needed, for example, because the rapid fire action is hard to detect in real time.

Slo-mo

Last year's Olympics took slow-motion replays to a new level with the super motion system developed by Sony and ABC (see Julie Barnathan's story in the May, 1985 issue of *BM/E*). It involves a high-speed camera operat-

ing at 90 frames-per-second, capturing three times the number of conventional TV images. When converted to the 30 frames-per-second of NTSC, the playback is produced at one-third speed with all the resolution intact.

The new slow-motion imaging does away with problems that had existed for a long time with the traditional way of showing slow motion by playing back a videotape at slow speeds. There is no blur during motion—even the individual muscle ripples of Olympic gymnasts were clearly visible.

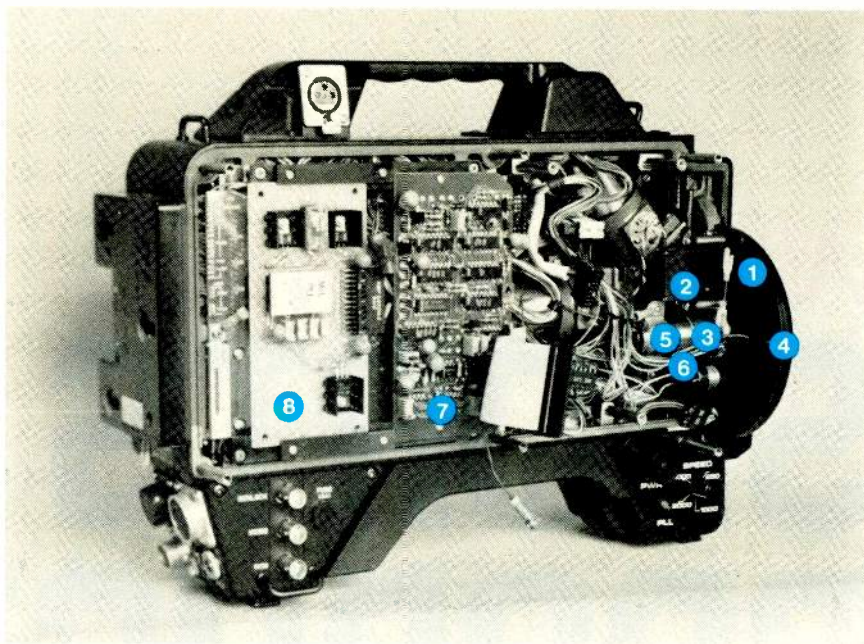
It was only a matter of time before other TV sports departments came up with improvements to slow-motion replays to match Sony's. The key is better overall video resolution so that when the slow-motion technique of replaying a tape at slowed speed is employed, the picture doesn't have the blur of movement.

Rotating shutters

Nisus and RCA have each developed a similar system that uses a rotating shutter to achieve improved video imaging. The Nisus shutter has been used by CBS and the RCA shutter by NBC.

Nisus uses a circular focal plains shutter that rotates at 60 times a second, to correspond to the 60 fields-per-second of the NTSC signal.

With a normal camera, continuous action is read continuously from the tube or chip 60 times a second; as one image is being read another begins, so the picture shows up blurry. The Nisus shutter, however, phase-locked with the camera and rotating at 3600 rpm or 60 times a second, has only one opening for light. Instead of providing a continuous image to the tube or chip, the shutter exposes the tube only during vertical retrace, giving a finite amount of information for the camera to read. By breaking up the light entering the camera, the shutter provides a discrete, or finite image 60 times a second, and thus provides a much clearer, higher resolution image—which, when played



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The Nisus Rotating Camera Shutter.

The Electronic Empire

TV sports producers have long wished for a way to give the home viewer the perspective on the action seen by the participants themselves. Thanks to a new camera developed by ABC Broadcast Operations and Engineering, they can do just that.

A microminiature solid-state camera can now be mounted onto the face mask of a baseball umpire, giving a behind home plate view of the play.

According to Phil Godfrey, manager of special projects for ABC's BO&E division, the miniaturized camera was first used on-air during



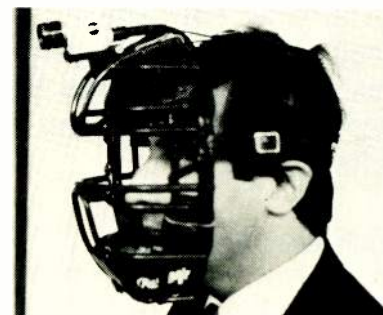
Phil Godfrey of ABC's BO&E division displays the battery and support belt, and Dennis Lewin, VP of Production Coordination, holds the umpire's face mask containing the new micro-miniature camera for use in TV coverage of baseball.

ABC's telecast of the Little League World Series in late August, attached directly to the home plate umpire's mask—the first time that an actual participant in a sporting event had become a human camera mount.

On air, viewers saw a unique perspective of home plate, the batter, the pitcher, and the ball. Signals from the camera were relayed from the miniature 7 GHz, 10 milliwatt transmitter on the umpire's hip pack, which also contains camera electronics and battery power, to a receiver in the press box and on to ABC's remote truck for use as live shots or instant replays during the game.

The camera itself, which has been under development by ABC since last winter and weighs only 0.25 pounds, was developed through the use of the latest CMOS chip from Hitachi which offers 250 lines of resolution. The camera can be outfitted with a range of f/1.8 fixed-focal-length lenses in 4.8, 8, 12, 16, and 25 mm lengths. With the 4.8 mm lens, the camera affixed to the umpire's mask sees most of the infield as well as home plate itself.

The camera and transmitter are

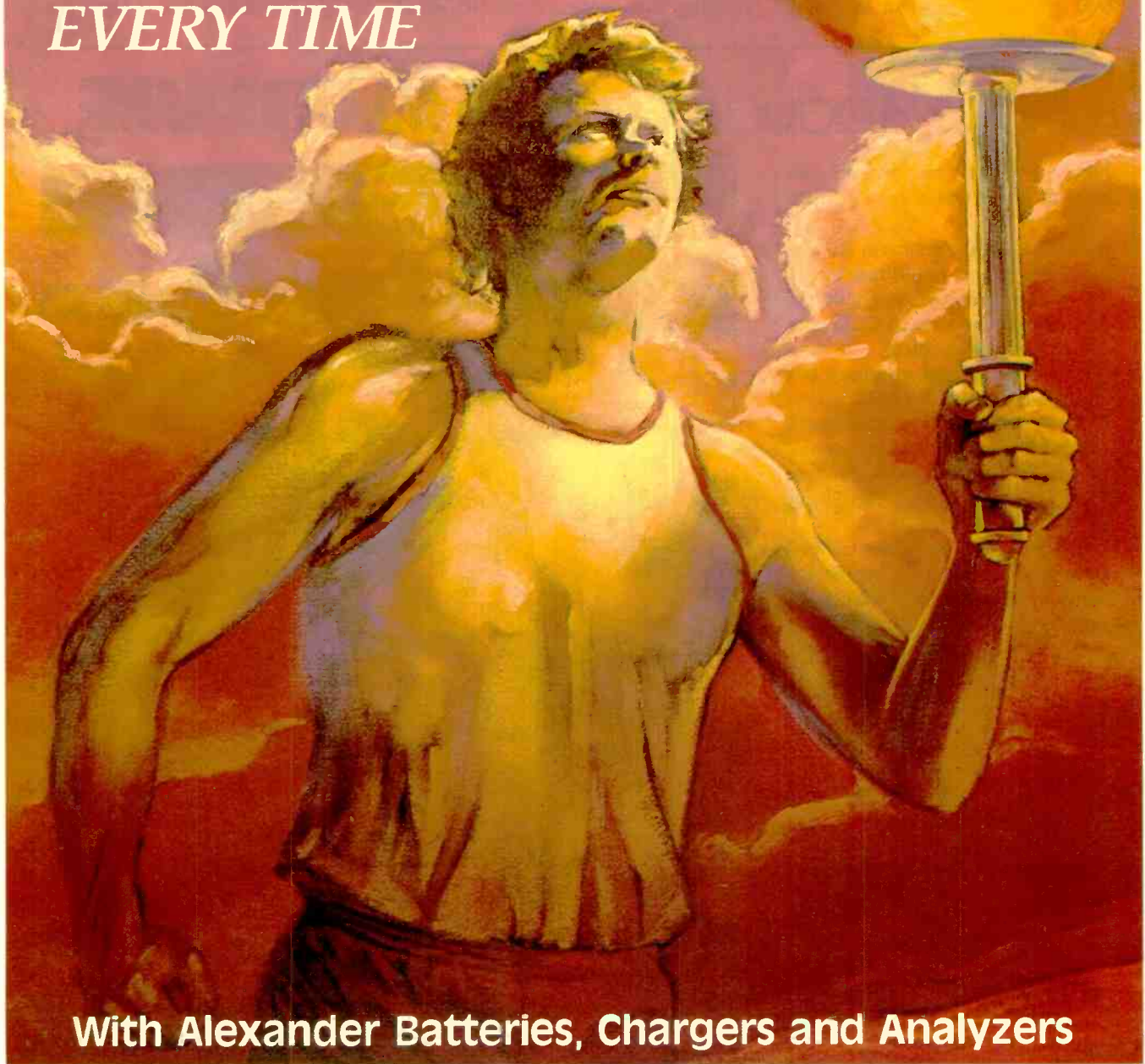


Dennis Lewin of ABC wears the umpire mask with camera mounted to the top which gives a participant's perspective of home plate action.

powered by a small, replaceable nicad battery, which runs the system for approximately 1.5 hours. Battery changes can be accomplished between innings.

Major league baseball officials are interested in the new camera, which doesn't seem to pose obstacles or distractions for the players or the umpire. ABC is hoping the camera could be used in future coverage of major league baseball, and it's not at all unlikely that TV sports producers could find ways to adapt it for other sports where officials or referees are surrounded by the action.

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back at slower speeds, does away with the fuzzy look, especially in the picture's background.

The continuously adjustable shutter allows the camera operator to change

the size of the opening in the shutter, from 1/250 to 1/4000 second. The shutter is actually two shutter blades with corresponding openings. To adjust the opening, the blades are rotated toward

or away from each other. By reducing the size of the opening, the image is exposed to the camera for a shorter time. Less exposure allows the camera to get a higher resolution during faster action.

NBC's Production of **THE ALL-STAR GAME**

NBC's broadcast of July's All Star baseball game was a first in many ways.

NBC used 12 cameras in all, with main coverage provided by 10 TK-47s stationed throughout the Metrodome, and an RCA CCD positioned low at home plate.

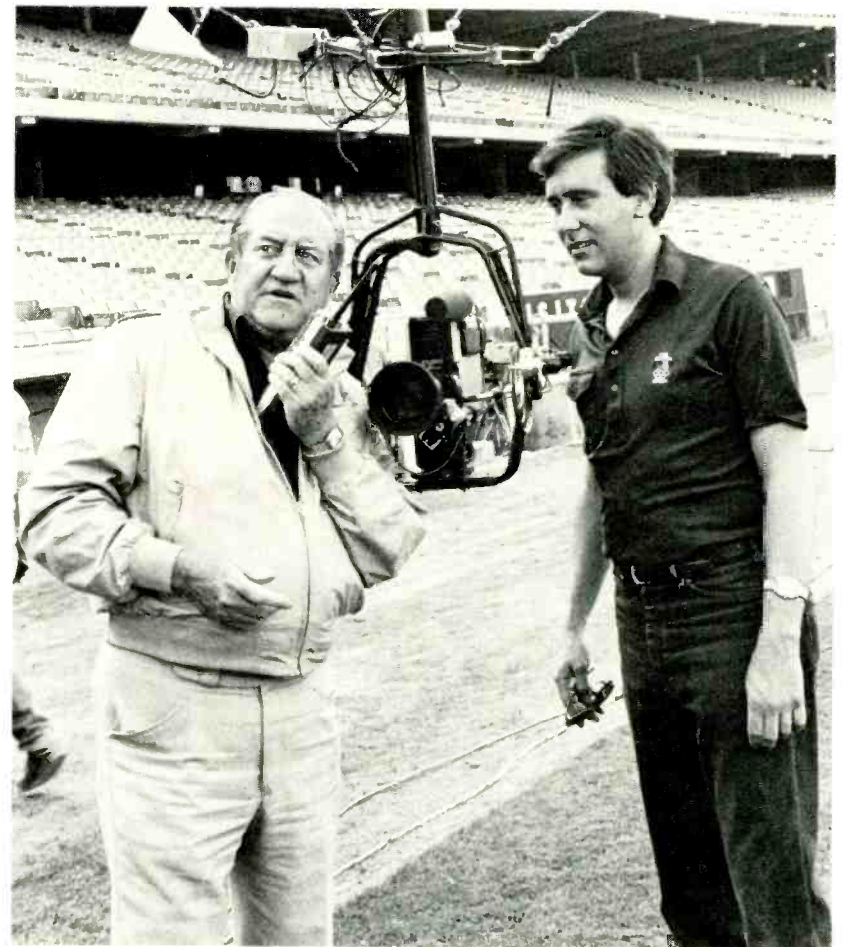
The covered stadium posed one immediate problem for NBC Sports: how to get those all-important aerial views? Obviously a blimp was impossible. NBC therefore decided to bring the Skyworks Skycam "flying camera" to the game.

Skycam was restricted to hovering behind the foul line until a home run was hit, or unless the action halted while a manager came out to talk to the pitcher. Skycam used a Panasonic AK100 camera to shoot overhead footage.

The RCA CCD camera at home plate was used for some high-resolution slow-mo shots, using RCA's 1/500 second shutter. When in use, the clarity of the image was noticeable. For slow-mo, instant replays, and the rest of NBC's coverage, the network had nine Sony BVH-200s, two Sony BVU-820s, two Chyron IVs, and a still store.

The All Star Game also marked NBC's first major coast-to-coast broadcast completely on the Ku-band satellite.

New video technology wasn't the



NBC's directors Harry Coyle and John Gonzalez prepare Skycam for its baseball debut at the All Star Game.

only cause for excitement at the game. The All Star broadcast also

marked the first live national telecast using MTS.



NBC director Harry Coyle calls the All Star shots from the master control truck.



Sports announcers Vin Scully and Joe Garagiola call the game's play-by-play from the NBC broadcast booth.



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TV sports crews have used various speeds on the shutter to cover different sports. The broadcast of the Belmont Stakes by CBS used the slowest speed on the shutter, 1/250 second. NBA basketball, also a relatively slow-action game, used 1/350 second. CBC's broadcast of the NHL's Stanley Cup used 1/500 second.

Nisus president Joe Streeter points out other advantages of the continuously adjustable feature. One is the ability to adjust the size of the opening while the camera is in use, which could be important in a sport with varying speeds of action, such as baseball. This also allows a camera operator to pull out from a closeup on the ball to a wide view of the players in the outfield or the end-zone without them appearing blurry.

Another use, according to Streeter, is the ability to achieve resolution approaching that of film.

"1/4000 second could give you the look of film, for promotional pieces, such as one recently done by the Chinese on gymnastics using our shutter at that speed," Streeter says.

The Nisus shutter can be used with both chip and tube cameras, and can

also eliminate some comet-tailing in tubes because of the discrete image it supplies. Since it's the flow of the image, a tube retaining one image while another appears, that causes such problems, the blocking of light as the shutter rotates would decrease the amount of comet-tailing that occurs.

Right now, the Nisus broadcast line includes only the Ikegami HL-79E camera, although it could be adapted for any camera. Nisus shutter N-79E includes the Ikegami camera. Streeter says Nisus would like to see its shutter incorporated into camera design eventually, perhaps as early as third generation cameras. The costs are relatively modest: \$25,000 for the shutter, under \$60,000 for shutter and camera, according to Streeter.

CCD plus shutter

RCA is in the process of evaluating the possibility of using the Nisus continuously adjustable speed shutter on its CCD camera. NBC has been using the CCD camera with RCA's own rotating shutter for some of its slow motion.

The RCA CCD camera requires a

shutter for its operations, and RCA offers one at 1/90 second or one at 1/500 second for higher resolution, especially during motion shots.

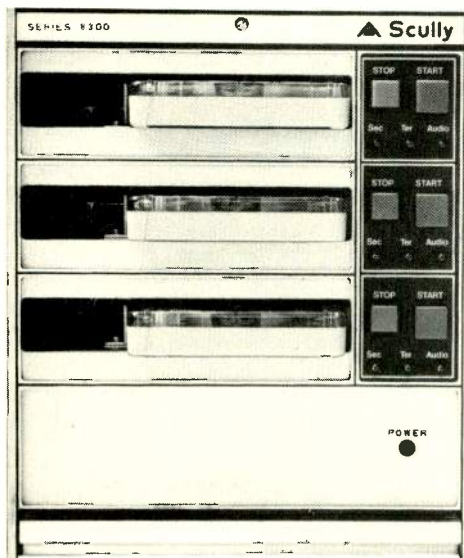
But the RCA shutter differs from the Nisus shutter in several important ways. For one, it has two openings rotating at 1800 rpm instead of one opening at 3600 rpm on the Nisus shutter. Secondly, the speed of the shutter is fixed at 1/500 second and is not adjustable. One NBC director points out that while the RCA shutter is good for closeup shots, it doesn't perform as well for wider slow-mo shots during sports action.

However, the CCD has excellent light sensitivity and eliminates the burnout and comet-tailing of tube cameras, which does help resolution during slow-mo shots. RCA may be working with Nisus on an adjustable speed shutter for its CCD in the future.

Steady as she goes

In the past, sports action shots have been limited by the restricted movements of live camera operators. The only shots possible were those that a

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ITC would like you to believe they first conceived the modular tri-deck cart machine, but really it was part of the Scully 8300 way back in 1981.

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Panasonic
Broadcast Systems

ANOTHER BROADCAST INNOVATION FROM MATSUSHITA ELECTRIC

human being could view through a camera lens from the sidelines. Now, however, it is becoming almost commonplace for major sports to include coverage from a vehicle or airborne position—introducing the problem of instability caused by the vehicle's motion.

Gyro-stabilization is the solution, and there are currently two major approaches to the problem. One can be said to be aimed more for low-end operations, and one for those at the high end. The chief difference in the two methods is that one stabilizes the image internally, by driving the lens with a gyroscope. The other also uses a gyroscope, but it stabilizes a special mount to which the camera is affixed.

The Schwem Gyrozoom 60/300 gyro-stabilized lens borrows an optical stabilization technique from the military that is sometimes referred to as "direct force." As the lens is moved, the gyro is displaced, and as it seeks to right itself, it exerts a direct force on the lens's prism, whose movement compensates for the displaced optical path. The system was developed by Dr. Luis Alvarez, who won a Nobel Prize in

1968 for his work in particle physics.

Using this technique, it is possible to eliminate virtually all high-frequency vibration resulting from planes, cars, boats, helicopters, and the like, as well

as platform vibration. Even when traveling in a car at 30 mph, the lens produces good results.

The advantage with the Schwem lens, of course, is that it is extremely easy to use. Indeed, the operator should notice no difference in operation between the stabilized lens and an ordinary lens. It weighs only six pounds and attaches to the lens flange of most ENG cameras easily. Its zoom capability is 60-300 mm while maximum aperture is f/6.2. It costs \$12,500.

San Francisco stations KPIX and KRON have both used a Schwem Gyrozoom lens to cover the San Francisco marathon and other area races. There was also a prototype of the lens at the Olympics, but Clay Sylvester, vice president of operations for Schwem, says the company is really targeting local stations more than network sports crews.

"It think it's a pretty cost-effective tool for stations," Sylvester says. "They could rent a lens the first few times and then would probably buy one. It's ideal for walking-around situations, or roving camera shots, for marathons and bike races, but would



Winged Vision's gyro-stabilized camera mount is affixed to the back of vehicles for marathon coverage.

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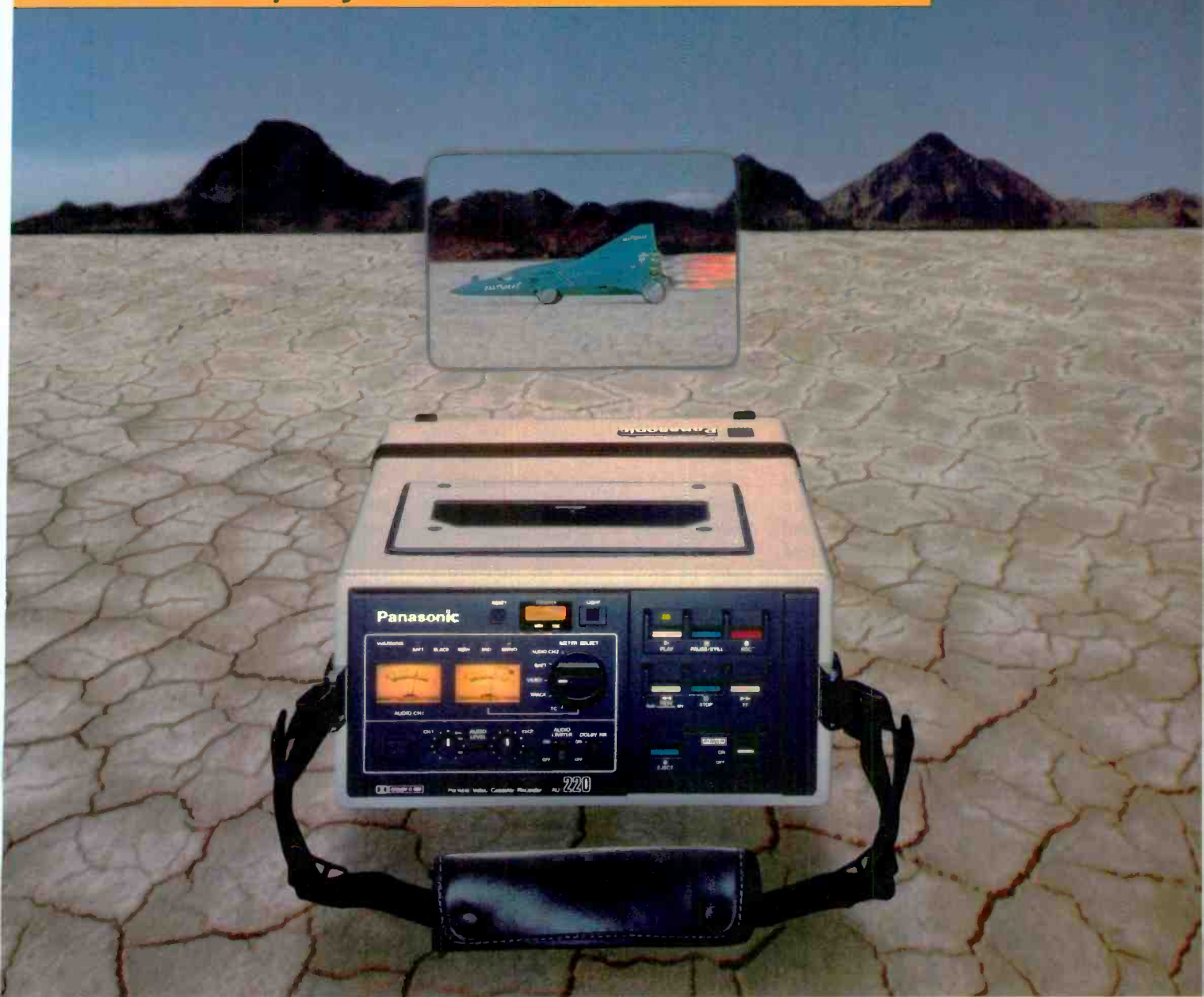
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Panasonic
Broadcast Systems

ANOTHER BROADCAST INNOVATION FROM MATSUSHITA ELECTRIC

probably not be at home in center-field."

Bob Mikkelson, through his company Winged Vision, uses an entirely different approach than Schwem. His is a gyro-stabilized mount, which he calls a "no-compromise" system.

Mikkelson also borrowed from the military to develop his system. It uses a "rate" gyro, which spins only as a reference point. Force on the gyro is sensed and converted into voltages that control dc torque motors, which in turn make the appropriate correction.

In this system, the camera rather than the lens is stabilized. The gyro is on the elevation gimbal, and the camera is bolted rigidly to the frame.

Mikkelson shoots with a Canon J40 lens, which when extended gives up to 80x magnification. He can zoom from 9.5 mm to 760 mm, which is one reason a lot of Mikkelson's work has been aboard the Goodyear Blimp for aerial footage of sports events.

The "no-compromise" system is also fairly expensive, especially since Mikkelson usually rents himself and the system as a package deal. The cost for a long weekend could run as high as

\$10,000.

Network sports departments have used Mikkelson's system for events such as the Orange Bowl, but Mikkelson has recently targeted local, even medium market stations, and will do a less elaborate shoot at considerably less expense. Local stations, such as WOC in Davenport, IA have called on Mikkelson to shoot footage from the lead vehicle in a regional marathon race.

"I admit that for some situations my system would be overkill," he admits. "But stations spend a lot of time and money on sports events, and almost all who have seen the finished footage felt it was worth the extra cost."

Another gyro-stabilized system that is being used to cover sports from moving and airborne vehicles is Magic Moment, a system manufactured and marketed by president Alex Carey and used by ENG Helicopters. But while Mikkelson's system uses a gyro to measure the movement, and motors to stabilize the camera, Carey's gyro acts upon the camera itself. The gyroscope, or in some cases two gyroscopes for twice as much force, are attached to

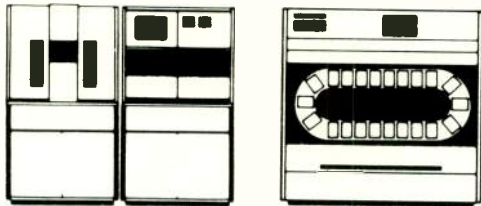
that part of the mount closest to the camera. Carey says it can also be attached directly to a handheld camera as well. The force of the gyro stabilizes the camera during motion.

ENG Helicopters uses cameras weighing 15 pounds or less, usually a Sony 330 or Ikegami 79E. Camera mounts are fitted to helicopters, usually one owned by the TV station itself. Mounts have also been used on motorcycles, trucks, and cars for marathons and auto races. When a ground vehicle is used, a helicopter with a microwave setup usually follows to receive the video and transmit it to a broadcast tower on a tall building.

Carey's company performs a variety of services in covering sports events. He will equip ground vehicles and helicopters, and/or provide the microwave relay to the station. For more elaborate coverage, perhaps two ground vehicles and a helicopter, the cost of using the system could run as high as \$10,000 per shoot. For smaller setups, especially those using motorcycle mounts, costs could be lower—about \$7500.

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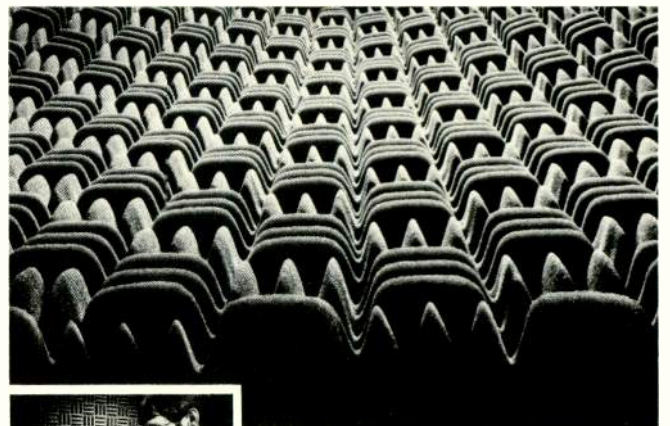
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more unusual airborne and vehicle-based coverage has been remotely controlled cameras (see "Remote-Control Pan and Tilt," *BM/E*, April, 1985). Now cameras can be mounted onto race cars, the backboards of basketball nets, and the like.

An angle on danger

One system that is designed to be used in such a way is the Sports Cam from Matthews Studio Equipment. Encouraged by the success of its E.F. Nettman-designed Cam Remote, which uses a motorized servo to allow for pan/tilt and zoom/focus from a remote site, Matthews designed a system for ENG/EFP cameras that can be mounted in dangerous sports settings and can provide unique points of view. Matthews rents its Sports Cam system, excluding camera, for about \$600 per day of shooting, which might make it feasible only for more elaborate sports productions.

While Matthews is aiming its Sports Cam directly at the TV sports production industry, other remote pan/tilt systems that have been recently introduced

could enjoy similar applications. Cinema Products has its own version of the Matthews Sports Cam, employing the same technology. Two other companies, Vinten and TSM (Total Spectrum Manufacturing), market microprocessor-driven remote pan/tilt systems. Vinten's U.S. branch Listec sells the Microswift 200, a digital remote system, for around \$50,000 per camera.

TSM's system is the HS-100P, and the company also markets a four-camera control unit. The controller costs around \$15,000, with a \$6800 pan/tilt head and \$1100 zoom/focus lens drive needed for each camera.

Water sports coverage

Shooting water sports from beneath the surface has always posed a challenge to videographers. Various devices have been tried, but in the last few years a new casing that allows for videotaping with either an Ikegami 79E or Sony's Betacam system has been developed that offers some advantage over film or other taping techniques.

Self Contained Electronic Aquatic Media (SCEAM) was created by Brian

David Andersen, an independent producer. It's a housing for either the Ikegami or Betacam camera, made of 383 aluminum and completely waterproof, which allows a diver to operate the camera from outside the casing.

The casing allows a camera to be submerged to a depth of 250 feet, or to 5000 feet with the addition of an air tank to equalize the pressure.

With the Beta system, the shooting-recording is self-contained, and with the Ikegami camera either cable carries the picture back to a recorder on a boat, or Andersen fits a BVU-50 into its own casing to be submerged with the camera.

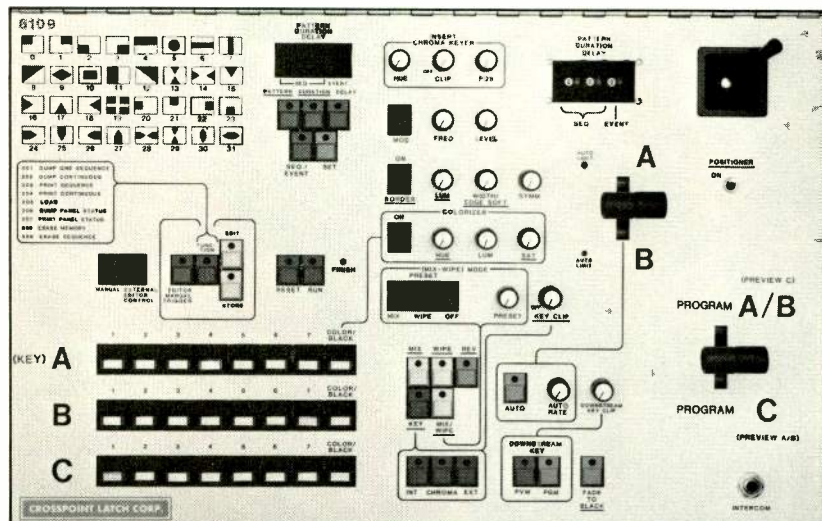
A communication system designed by Ocean Technology Systems allows the diver to talk to surface, either with a wire or wireless mic, and can also pick up ambient underwater sound.

Andersen rents the unit, with himself as its diver-operator, to stations and production crews for \$900 a day if he uses his own camera, \$700 a day if the station supplies its own camera. He also sells the casings to stations for \$10,000 apiece, which puts him into direct competition with himself. But for

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special water events, stations and networks would probably find it more feasible to hire the experienced Andersen rather than set up an aquatic unit of their own.

Andersen recently shot footage of a water ballet for KOAA, Pueblo, CO. His units were also used for all underwater footage at last summer's Olympics, but were operated by ABC union camera operators.

Airborne shots

A sports stadium all but cries out for aerial views of the action below. Al-

most from the beginning of TV sports, it has seemed only logical to take a camera up in a flight vehicle of one sort or another and get a birds-eye view of a football tackle or track meet.

By far the most exotic form of airborne camera shots to come along is Garrett Brown's Skycam, the "flying camera."

Skycam uses a system of motorized pulleys through which steel cables are drawn. A computer control instructs the pulleys how much cable to let out or take up from four stationary

points high above the action. Through vector-like movements, the camera can "fly" forward, backwards, sideways or up and down. Moves can be stored or preprogrammed into the computer control, and an operator or pilot uses a joystick to determine the movements. Remote control operates the pan/tilt/zoom and focus of the camera.

Skycam's specialties are swooping-away or follow-around shots that could never be achieved with handheld or stationary mount cameras. Even the Goodyear Blimp or a helicopter setup has more limited movements than the tricky action of the lightweight camera setup of Skycam.

Skycam is not an inexpensive effect, as it takes trained operators and is rented out at about \$30,000 per shoot, including pilots. But network sports interest has been high, and Skycam has been seen at football, basketball, and baseball. And as viewers come to expect the unusual flying motion in TV sports footage, more stations may consider the "flying camera," perhaps for one-time-only special events.

Another way of going aloft is the Goodyear Blimp, which has been around for 25 years, and has become as widely expected at sports events as the athletes themselves.

More recently however, Goodyear has begun to gear its airships more with an eye towards sports video, and plans are in the works for a new blimp that will achieve many of the video techniques, such as replay and slow motion, now done from a control booth on the ground.

Most viewers associate the Goodyear Blimp with network sports events such as the Superbowl, but Mickey Whitman, who handles PR for Goodyear, explains that Goodyear has actually done more local station coverage than network events, and receives about 50 local station calls per week for the use of the blimp.

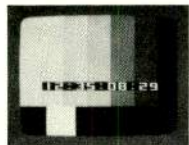
"A lot of stations think we charge for the blimp, but that's not true," Whitman says, adding that the only limitation is the blimp's availability. "We did 70 events last year and had to turn down 200."

Actually there are four Goodyear Blimps—one in Europe, and three others stationed in Los Angeles, Pompano Beach, and Houston that travel about six months out of the year all over the country.

"All we ask," Whitman says, "is that the station provide us a microwave channel."

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Shooting is done out of the side of the blimp, and Whitman says the company is in the process of developing a new blimp designed especially for TV coverage, with play-by-play capability. According to Whitman, it will use an outside mount, gyro-stabilized, and will have replay capabilities as well.

Keeping track of the action

Another type of new equipment coming into play for sports production, video multiplexers, had its birth as part of the surveillance marketplace, much like remote pan/tilt devices. Cable systems have found them useful for splitting signals, and they are used in Europe as an electronic TV guide.

Videoplex's line of multiplexers offers a split screen of video from four to 16 sections. The addition of PC boards into the control unit determines the number of boxes on the screen.

One of the advantages of a video multiplexer like Videoplex is that it accepts as many different simultaneous video sources as there are boxes. For example, the 16-box version could take simultaneous video feeds from 16 live cameras in real-time. Titles can be in-

serted into each box to identify them, and the entire process is controlled from a keyboard.

ABC used a Videoplex unit to monitor coverage of last summer's Olympics in Los Angeles, and NBC has used it for golf.

Its application in TV sports could be as a monitoring device when many cameras are in use, as a director's tool, or even, although the networks seem hesitant about this possibility, as a direct on-air split screen effect.

Another advantage of the Videoplex multiplexer is its price range. The 2x2 black-and-white unit is priced at \$13,800 on the low end, while the 4x4 or 16-box color unit costs \$44,500. That would make it feasible as a backup control switcher, or a portable unit.

Digital Video Systems, a subsidiary of Scientific-Atlanta, also makes a video multiplexer. The DPS-130 Four-Matte generates 2x2 or four simultaneous boxes and is available in black-and-white or color. Instead of a keyboard, the Four-Matte uses a control box, and a switcher must be added to switch from split- to full-screen viewing. Titles for each box are pro-

grammed into the system's memory, and without a keyboard, cannot be changed immediately.

DVS manager of sales and marketing John Fazacherley says the company intends to maintain the four-box screen because in large configurations the screens "tend to be too small to provide enough useful information." He says there has been broadcast interest in the product, and that it's best application would be as a camera monitor.

"It's ideal for a mobile unit where space is at a premium," Fazacherley explains. The Four-Matte costs \$30,000, either in black-and-white or in color, and Fazacherley says the company would consider marketing it to TV sports departments if there's enough interest in that application.

As with any video innovation, especially one trying to enter the highly competitive and lucrative TV sports marketplace, video multiplexers have to prove themselves before gaining greater acceptance.

But, medium and smaller stations might find the multiplexers cost-effective when trying to upgrade or expand their video sports coverage. **BM/E**

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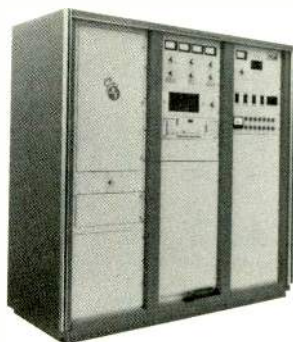
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David Hooge, Chief Engineer KEYC, Mankato, Minnesota

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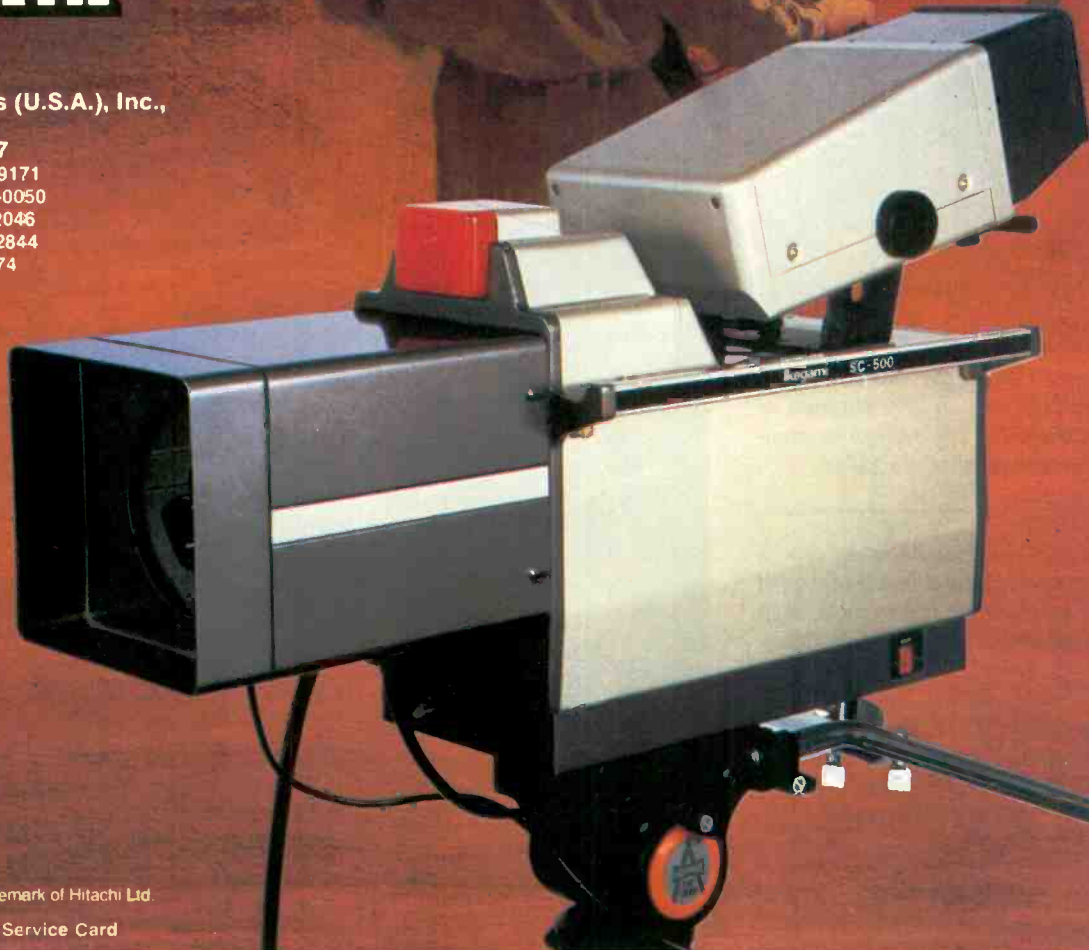
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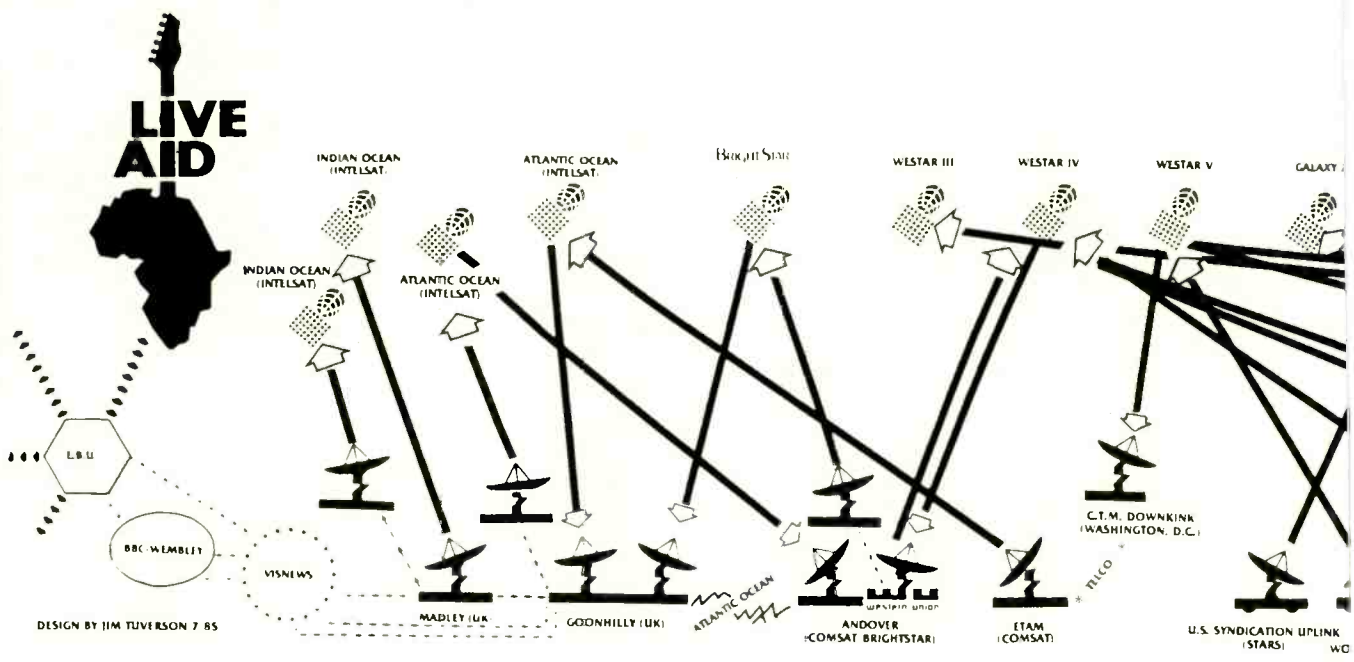
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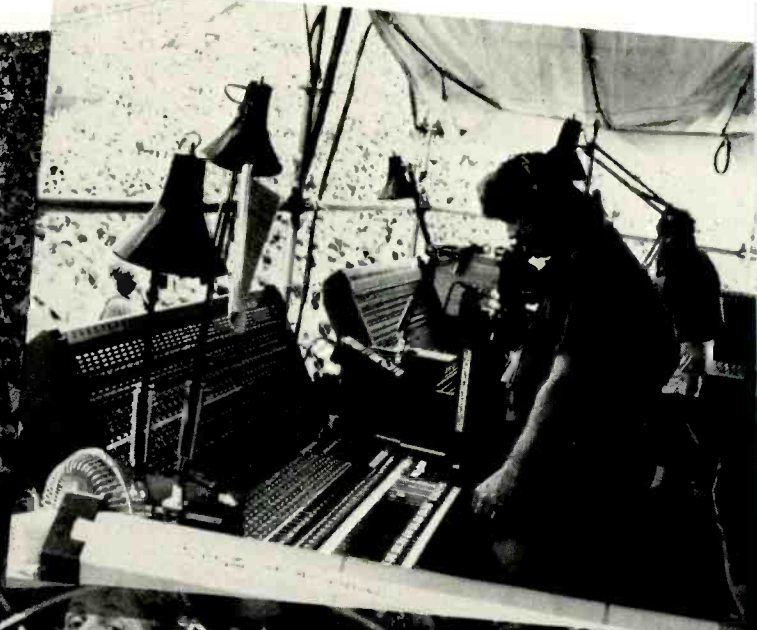
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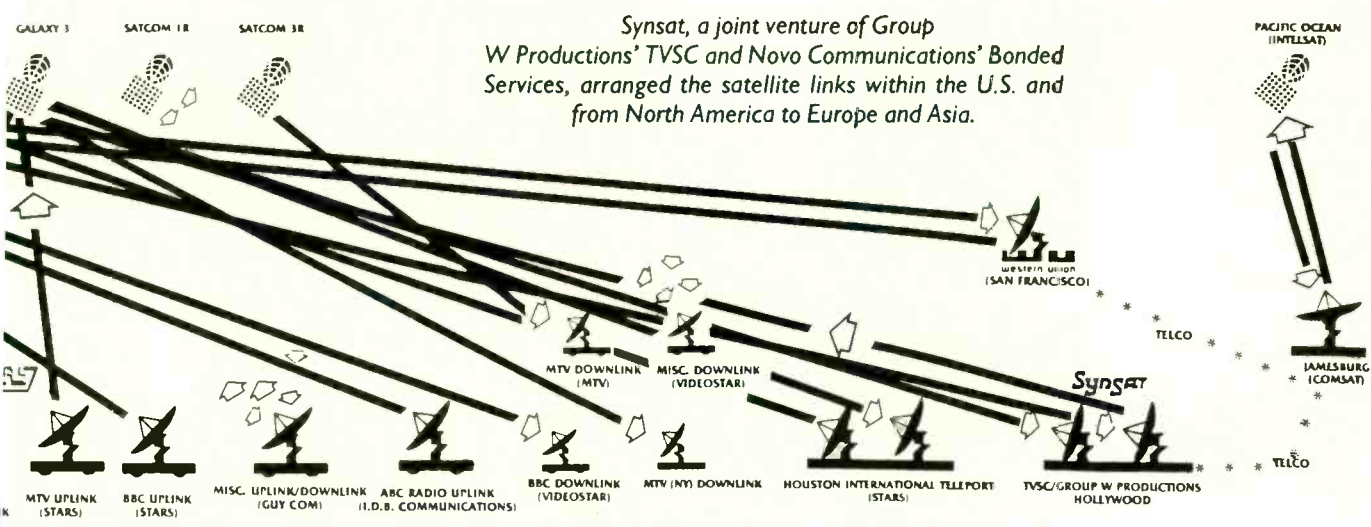
Above: Part of the 100,000-member audience at JFK stadium in Philadelphia. The worldwide audience totaled 1.5 billion.



Above right: Each PA sound control board handled a different section of the stage, while three trucks dealt with the version for distribution.



Right: For the U.S. finale, a mosaic of performers' faces was assembled within the concert logo using a Quantel Paintbox.

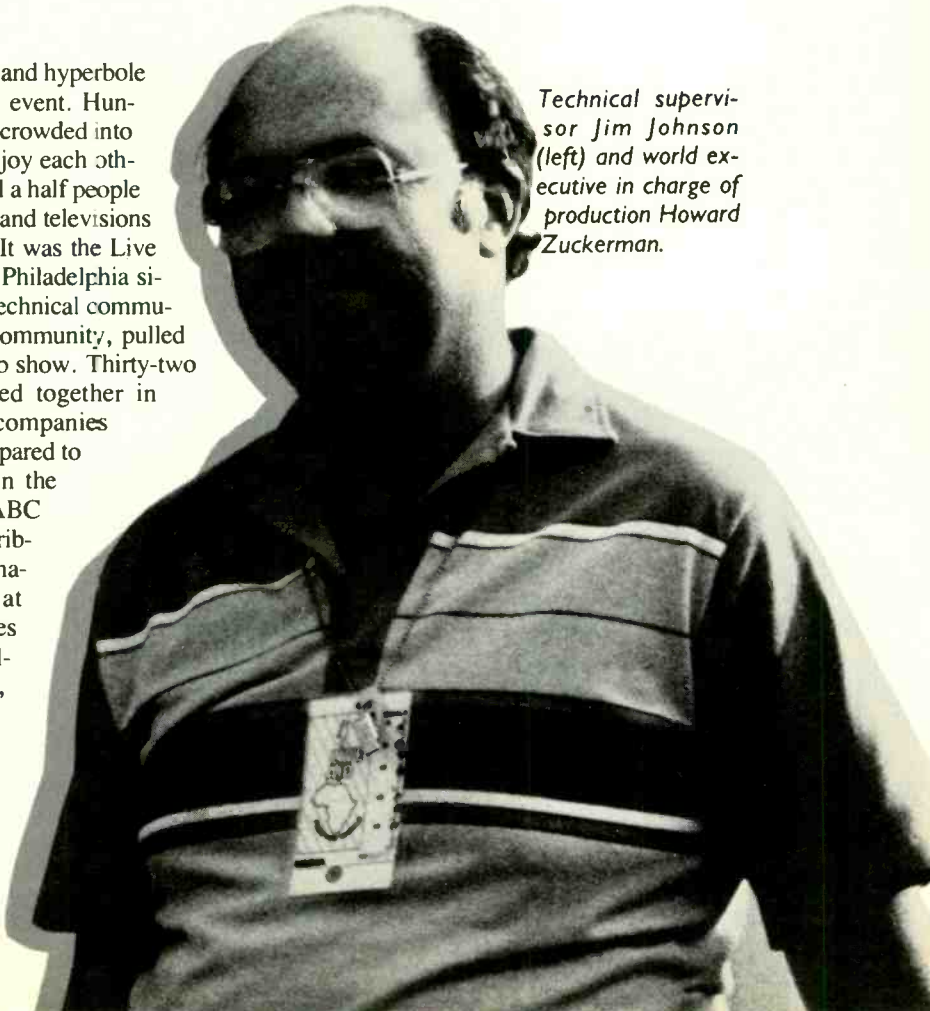


Synsat, a joint venture of Group W Productions' TVSC and Novo Communications' Bonded Services, arranged the satellite links within the U.S. and from North America to Europe and Asia.

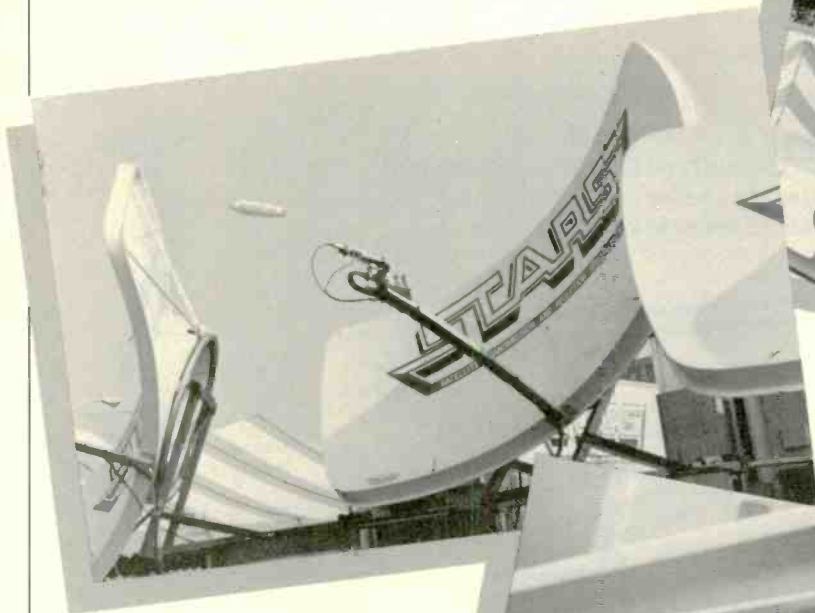
“We ~~are~~ ^{REACHED} the world!”



It was, even if you ignore the hype and hyperbole that accompanied it, an amazing event. Hundreds of thousands of music fans crowded into stadiums around the world to enjoy each other's performers, and a billion and a half people listened and watched with radios and televisions in countries on every continent. It was the Live Aid concert, live in London and Philadelphia simultaneously. For this event the technical community, as much as the rock music community, pulled out all the stops and put on a superb show. Thirty-two equipment trailers were sandwiched together in Philadelphia; at least 15 satellite companies linked 22 transponders on 13 birds (compared to four satellites for the Olympics); in the U.S., a syndication of over 70 ABC and independent stations distributed audio and video signals nationally. As for results, at presstime Live Aid continues to draw a half million dollars a day in donations, and the 800 LIVE-AID number has been reopened. Those sending money directly should address it to: Live Aid, PO Box 7800, San Francisco, CA 94120.



Technical supervisor Jim Johnson (left) and world executive in charge of production Howard Zuckerman.



Four of the uplinks came from STARS of Houston. Helicopters, planes, and the Goodyear blimp had to be kept out of the satellite signal path after several interruptions.

Monitors show STARS' feed to MTV in New York City, the BBC via Maine, and ABC and independents in the U.S. Hours of performances from England were aired live in the U.S., while earlier satellite feeds from Australia, West Germany, and Moscow were taped.



The trailer compound was also filled to capacity with 32 semis and nine dishes.



Over 250 people were involved in producing and delivering the Live Aid concert in the U.S., one of the most complicated challenges the industry has ever met.

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RADIO REBUILD REACHES FOR THE SUMMIT

What does it take to step directly from crumbling technology to the state of the art? Time, testing, and attention to detail were the answers for WSJS/WTQR.

By Jay O'Neal

Until recently, a visitor to WSJS-AM/WTQR-FM, Winston-Salem, NC, stepped back into radio's past: old vacuum tube consoles dating back 20 years or so; recorders and reproducers long past their prime; and a hodgepodge of other equipment spanning three generations. Everything seemed to be an add-on, an afterthought, the result of engineering "making do" over years of changing technology and audience demands.

As WSJS was the older of the two stations, its studios had evolved as the hub of operations for both, as well as for the associated Wake Forest University Sports Network. A variety of outside feeds, signal sources, and telco lines terminated in the AM control room. Levels were impossible to maintain, patching was at mixed levels, and signal interaction was common. Every time telephone service workers came for repair or installation they marched right into the on-air studio, unannounced. Clearly, it was time to talk



WTQR's upgraded control room features a custom Auditorics 200 Series on-air board, along with Otari ATRs and ITC 99 Series cart machines.

management into a move to the future.

Fortunately, the stations' owner, Summit Communications, was open to working with the stations' staffs to identify and solve the problems right down to the equipment level. Management put together a three-year plan to bring WSJS/WTQR up to the current state of the art. Chief engineer Sam Mooney immediately stepped forward with a timetable to get the job done, and studio engineer Tom Caldwell was appointed to oversee installation and testing.

Master plan

Obviously, all studios could not be stripped and converted at once. Because WTQR-FM was a solid number one in the market, the station moved quickly to upgrade the production room, temporarily installing an Auditorics 110A Grandson console that has proven to be a real workhorse. Mooney's plans for completely rebuilding and reequipping this studio could then be shifted to the final phase

of the upgrade.

The next target was the FM transmitter plant. As the transmitter and antenna were of recent vintage, only the exciter was replaced. The new Broadcast Electronics FX-30 provided a dramatic improvement. The transmitter building also needed attention. Since the transmitter is on a mountaintop, moisture-laden air had been drawn inside, causing corrosion in the jackfields and subsequent noise problems. The old exhaust fan cooling system was replaced with a 15-ton, two-stage, closed-loop air conditioner, and all wiring and patch panels were replaced.

The big job, however, was to completely rebuild both air studios and add a news studio. Mooney's battle plan was first to build the news studio but use it for FM control, then build FM control and utilize the news studio for AM control. Finally, AM control would be built and the news studio could be put to its intended use, in full communication with the AM and FM air studios.

Plan in hand, Mooney and Caldwell

began selecting equipment, determined to avoid mistakes and surprises by purchasing nothing without first thoroughly testing and evaluating a demo unit. To simplify logistics and insure strong local service and parts support, as much equipment as possible would be purchased from a single source.

The demo process went on for several months. It seemed that the shop was always full of equipment under test, awaiting test, or awaiting removal. One at a time, preferred items were selected, and Broadcast Services Co. of Four Oaks, NC, was finally appointed the major supplier.

The final equipment list included custom-configured Audiotronics 200 Series air control consoles for AM, FM, and news. Master recorders would be Otari MTR-10s; less critical requirements would be served by Otari MX-5050Bs, with ARS-1000DCs for playback-only and ITC 99 Series cart machines. Technics SP-10 turntables would be used with Radio Systems PA-1 preamps. Microphones would be Electro-Voice RE-20s. Crown power amplifiers would drive JBL speakers. ADC patch panels wired to punch



In order to maintain WTQR-FM's number one standing, the production room was upgraded right away.

blocks would be installed throughout, utilizing various configurations of West Penn cable.

Keeping up standards

Testing didn't end with equipment

selection, however. Each new unit was thoroughly bench tested upon arrival, with any required alignments made and performance thoroughly documented before installation. At actual installation, a complete set of test measurements was made in the room to detect



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any degradation of signal or performance. This system of ongoing "proof" allowed the engineering staff immediately to correct any abnormalities. Further, as each item was installed and tested, various wiring routing and grounding techniques were investigated to assure the best possible performance. Manufacturers' recommendations were followed or improved upon when possible, and Mooney's staff found it could often achieve an S/N improvement of 3-4 dB in this way. The end result was a studio with a noise floor virtually identical to the consoles.



WSJS and WTQR share the news studio, which is built around an Audiotronics 200 Series console similar to but smaller than the ones in the control rooms. Turntable at far left is a Technics SP-10.

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The studio was completed with custom-designed, locally constructed cabinetry with built-in cable troughs. All signal wiring was run in troughs under the floor, while all ac and RF lines were installed in overhead conduit. Special ac receptacles with isolated third pin grounds were utilized, with each ground fed via insulated wire back to the stations' central ground point, and all equipment grounds connected to a large overhead copper bus that also ran back to the central ground. All signal shields were hard grounded, rather than capacitive grounded, at the source end only. Whenever a stereo source was connected, only one drain wire was used to avoid multiple ground paths. This overall grounding and routing scheme gained a 4-5 dB improvement over the previous installation.

A central control area was also constructed separate from the studios to function as the termination point for all studios, network and satellite feeds, STLs, and telco lines. In case of fast-breaking news or equipment problems, all network feeds—seven of them—are assignable to any studio on short notice. Any studio can substitute for any other in case of emergency.

Pains were taken to combine complete interconnectability with optimum isolation. Initially, it was feared that distribution amplifiers would degrade the studios' low noise floor. However, testing proved the Audiotronics 1100 Series DAs to be essentially transparent, and they were used throughout.

Again, experimentation with wiring techniques and systematic testing during installation proved invaluable. The installation utilized approximately 100,000 feet of wire, ranging from single- and dual-pair shielded to 15-pair with individual shields for interstudio runs. Tie lines were installed from each studio, including extra lines for future expansion. (All

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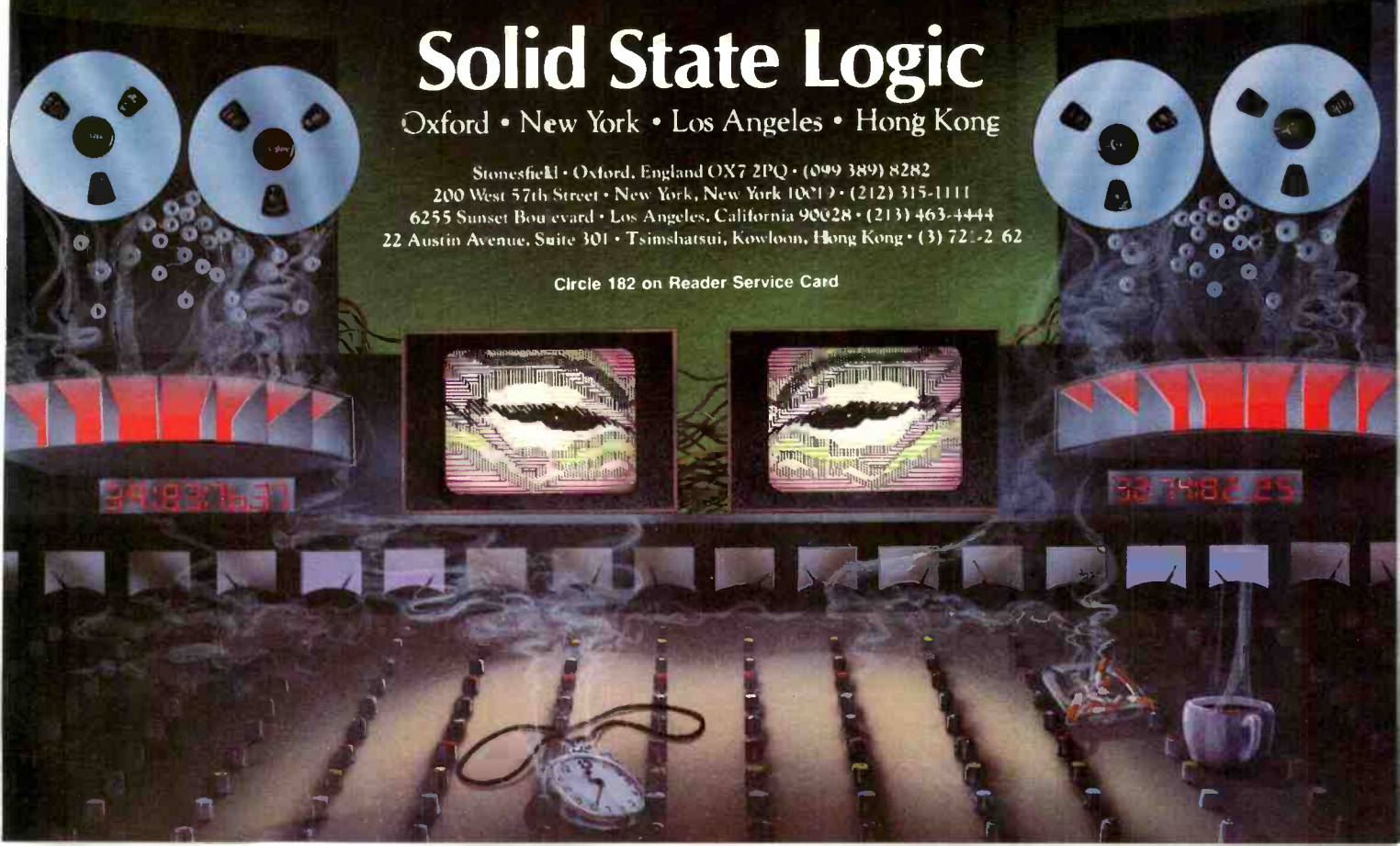
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The new two-channel belt-pack intercom station allows the operator to selectively monitor one channel or both simultaneously. It has a mike on/off switch and separate listen/volume controls for each channel as well as a special carbon headset input and separate sidetone adjustments. There is also a rack mountable version of this unit available with all the same features. Additionally, Telex has developed an entirely new line of intercom headsets to accompany these exciting Phase 2 changes. And, they are lighter and more comfortable than ever before! The new offering consists of single/dual side units, monaural and binaural units, a super lightweight and a new headset.

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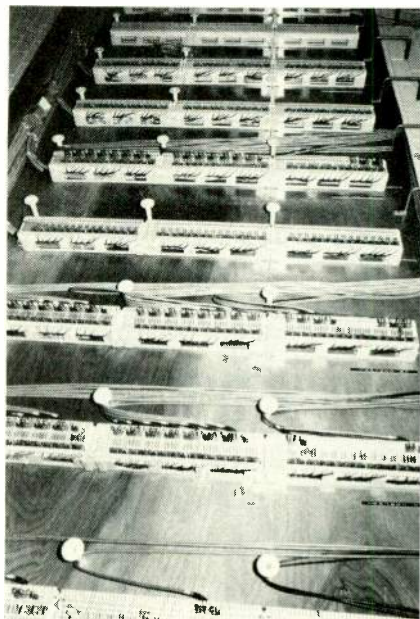
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unused lines have shorting clips at each end to kill any coupling effect they might have.) Rather than attempting to punch stranded wire into telco-type punchblocks, the station used color-coded 3M ST connectors, which simply crimp onto the wire and snap onto the punchblock.

This system not only optimized performance, but also resulted in unparalleled neatness of installation. All cable runs are well dressed and numbered. Run sheets document every wire, its source and destination, and are so thorough that a total stranger can easily look at the sheets and walk straight to any cable pair desired.

The personal satisfaction the staff gained from the job has been augmented by praise from outside. Mooney enjoys recounting a story



Neat cable runs show attention to detail.

about a call he received from the engineer of a major New York City station who happened to be passing through Winston-Salem. The visiting engineer told Mooney he had stopped by the side of I-40 just to listen to WSJS/WTQR's "awesome" signal quality.

Future plans

WSJS/WTQR's three-year upgrade is still under way. Remember the FM production studio that had a console temporarily installed? The next planned step is to rebuild the room completely and install an Audiotronics 300 Series console with VCA technology and stereo equalization. The room will be equipped for four-track recording, complete with Otari MTR-10 and a



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Other production enhancing options from Intergroup include stand-alone encoded and RGB chroma keyers, fade-to-black with a blanking processor and a digital pointer generator. Many of these options are contained in our 5010 rack frame which also houses some of the most affordable audio and video distribution amplifiers in the industry. Call 1-800-874-7590 today and let us add a little magic to your production system.



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Bryston has been known and respected for years as the manufacturer of a line of amplifiers which combine the transparency and near-perfect musical accuracy of the finest audiophile equipment, with the ruggedness, reliability and useful features of the best professional gear. Thus, Bryston amplifiers (and preamplifiers) can be considered a statement of purpose to represent the best of both worlds - musical accuracy and professional reliability to the absolute best of our more than 20 years' experience in the manufacture of high-quality electronics.

The 2B-LP is the newest model in Bryston's line, and delivers 50 watts of continuous power per channel from a package designed to save space in such applications as broadcast monitor, mobile sound trucks, headphone feed, cue, and any installation where quality must not be limited by size constraints. As with all Bryston amplifiers, heatsinking is substantial, eliminating the requirement for forced-air cooling in the great majority of installations. This is backed up by very high peak current capability (24 amperes per channel) and low distortion without limiting, regardless of type and phase angle of load. In short, the 2B-LP is more than the functional equivalent of our original 2B in spite of the fact that it occupies only half the volume, and will fit into a single 1.75" rack-space.

The usefulness of the 2B-LP is extended by a long list of standard features, including: Balanced inputs; female XLR input jacks; dual level-controls; isolated headphone jack; and individual two-colour pilot-light/clipping indicator LEDs for each channel. In addition, the channels may be withdrawn from the front of the amplifier while it is in the rack, vastly facilitating any requirement for field-service, including fuse-replacement.

Of course, in keeping with Bryston's tradition of providing for special requirements, the 2B-LP can be modified or adapted to your wishes on reasonably short notice, and at nominal cost.

Best of all, however, the 2B-LP is a Bryston. Thus the sonic quality is unsurpassed. The difference is immediately obvious, even to the uninitiated.

Other amplifiers in Bryston's line include the model 3B, at 100 watts per channel, and the model 4B, at 200 watts per channel. All ratings continuous power at 8 ohms at less than 0.1% IM or THD.

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full complement of effects and signal processing equipment. Of course, the station will use its proven installation techniques.

It is important to note that engineering was given the full support of management throughout this project, and Mooney is quick to point out that the overwhelming success achieved would have been impossible without their confidence. Pressure to rush the job was alleviated by temporarily relocating the air studio while the main studio was being rebuilt. A full 90 days was allotted for each, and not once did management step in to ask, "How much longer?" A mutually acceptable date was set at the beginning and was met.

Mooney emphasizes, "We had the budget to buy pretty much anything we needed, but we knew the equipment



A central control area allows any of seven network feeds to be rapidly assigned to any studio. The stations' Optimod-FM is visible at top right.

was only as good as the installation. It simply could not just be thrown together."

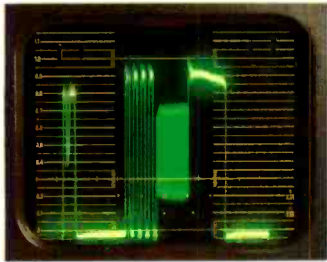
WSJS-AM, now with a completely renovated AM directional array, and WTQR-FM, still ranked number one, illustrate what is now necessary to maintain position in today's highly competitive entertainment market. Compact disc technology has boosted listeners' audio quality demands, and for radio to meet their expectations is a tough assignment. WSJS and WTQR are reaching for the summit. **BM/E**

Jay O'Neal is operations manager of WSJS/WTQR.

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As an EFP camera, the HL-79E can be used in various systems configurations, and controlled remotely by the MA-79 Multicore Adapter through multicore cable (up to 300 meters), or by the TA-79E Triax Adapter through triax cable (up to 2,000 meters). Available viewfinders include 1½, 4½ and 3 inch.

The camera can be set-up using conventional manual techniques or an optional microprocessor assist.

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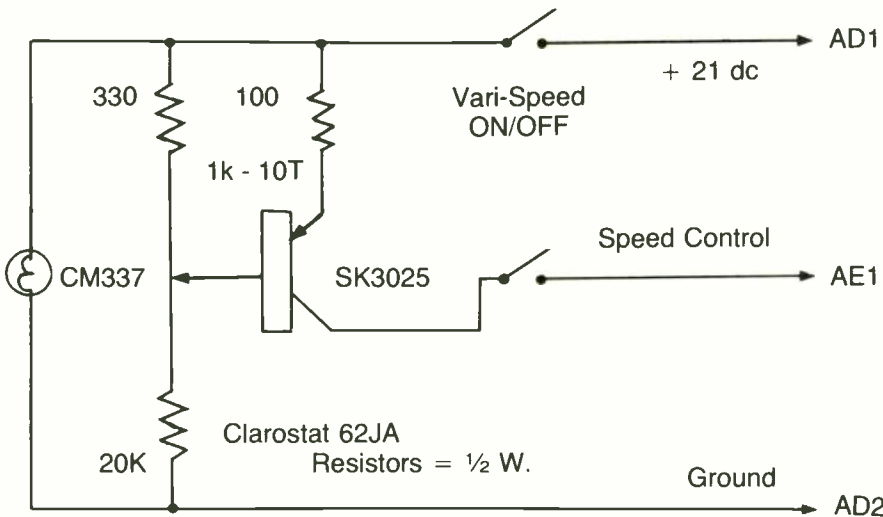
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GREAT IDEA NOTEBOOK

Revox A77 Vari-Speed Adapter

The Revox A77 vari-speed adapter.



By Ronald Balonis
CE, WILK
Wilkes Barre, PA

Normally, a tape recorder running off-speed is a sign that it's in dire need of maintenance. But when it's intentional, with the speed controlled and adjustable, an off-speed tape recorder is a useful tool for creative production. The Revox A77 uses an electronic motor drive circuit for speed regulation and changing. By controlling the bias current on the speed change circuit, it can become a vari-speed tape recorder that can be used for creative production effects and as a tool to clean up off-speed recordings.

The vari-speed adapter works with the Revox tape recorder in 3¾ ips, and varies the speed from 3¾ to 7.5 ips. To increase a recording's playback speed, record at 3¾ and then play back with vari-speed on. To decrease a recording's playback speed, record at 7.5 and then play back with vari-speed on. To play back at speeds above and below a recording's speed, record and play back with vari-speed on.

The adapter requires three connections to the Revox's switch board (1.077.435). The +21 V dc connects to tie-point AD1; it's located just below

the upper right-hand corner mounting screw and has a red wire on it. The speed control connects to tie-point AE1; it's located just to the upper left of the CHI playback connector, and also has a red wire on it. The ground connects to tie-point AD2. This is the bottom tie-point, with a blue wire, between the oscillator and record relay connectors.

The only critical part in the adapter is the 10-turn speed control, a Clarostat 62A 1k. As for the other parts, most anything close will do. At WILK, the adapter is mounted alongside the tape recorder with the connections brought out through a connector and a shielded cable.

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interpreting the FCC rules & regulations

The Comparative Hearing Process

By Harry Cole, FCC Counsel

When two or more competing applications for full service (as opposed to low-power television) broadcast stations are submitted, you've got the makings of a comparative hearing. The FCC's current system is to designate all such competing applications for a hearing to determine which applicant is best qualified to construct and operate the station. The issues designated for hearing could include questions relative to any applicant's compliance with FCC rules and policies, to the extent that those questions appear in the application itself. The issues could include additional matters that any of the competing applicants might try to raise against any of its competitors. But even if no such additional questions appear, the fundamental question to be decided will invariably be the "standard comparative issue," i.e., which of the applicants is best qualified to become the licensee.

Historically the Commission has assessed an applicant's comparative strength on the basis of two factors—diversification of media control and the ability to provide the best practicable service.

In diversification of media control, the Commission attaches a high priority to the goal of maximizing the number of "new voices" in the broadcast industry. The idea, of course, is to spread out ownership of broadcast stations to as many different licensees as possible, rather than concentrating the broadcast industry in the hands of just a few. Because of this, the Commission presently accords a significant preference to those competing applicants who hold no other media interests (including not only broadcast stations, but also newspapers, cable TV systems, etc.). To the extent that an applicant (or any of its principals) owns some such interest, that applicant is accorded a diversification demerit which, while not absolutely disqualifying, does substantially lower that applicant's chances of winning.

Demerits

The precise weight attributed to such a demerit depends on a variety of factors, including the nature and extent of the ownership interest, and the nature and location of the other media in which the interest is held. Thus, for example, if an applicant for a new FM station in Bangor, Maine happens already to own 100 percent of a full-time AM station in Bangor, that applicant would suffer a substantial diversification demerit. By contrast, if an applicant for

the Bangor FM station owns only a five percent nonvoting interest in an AM station in Anchorage, Alaska, a demerit would still be imposed, although the adverse effect of the demerit would be significantly reduced.

But you should not be discouraged if you happen already to own a station or two. Where a diversification demerit would otherwise be assessed, the applicant can avoid such a demerit by committing to divest itself of the other media interests in the event that its application is granted. That commitment should be made at the earliest possible stage—and generally no later than the cutoff date established by the Commission for amendments as a matter of right—in order to assure that it has the desired insulating effect. And for those of you who have a daytime-only AM station in a community in which the Commission has seen fit to assign one of the new Docket No. 80-90 FM channels, you would be entitled to a comparative advantage because of such ownership, if you happen to file for the FM channel newly-assigned to that community and if you happen to satisfy a couple of other criteria pertaining to such situations. Those criteria are described briefly below.

The integration factor

Best practicable service: The "best practicable service" criterion is normally evaluated in terms of an applicant's proposed "integration" of its owners into day-to-day management-level involvement in the station's operations. The Commission believes that it is preferable to have a station's owners actually present at the station and in charge of its day-to-day functioning. Thus, under the "integration" factor, the Commission assigns comparative preferences or advantages to applicants who propose to have their owners assume full-time management-level positions at the station.

In evaluating an applicant's integration proposal, the Commission looks at the proposal both quantitatively and qualitatively. The quantitative analysis involves a determination of how much of the applicant's ownership is proposed to be integrated into the station's management. This part of the analysis is pretty simple to understand. For instance, if the applicant is a corporation wholly-owned by a single individual, and if that individual proposes to work in a full-time management-level position at the station, the applicant is entitled to 100 percent full-time quantitative integration credit. If, by contrast, an applicant is a corporation consisting of four stockholders each holding 25 percent of the corporation's stock, and if

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only one of those stockholders proposes to work in a full-time management-level role at the station, that applicant is entitled to only 25 percent full-time integration credit.

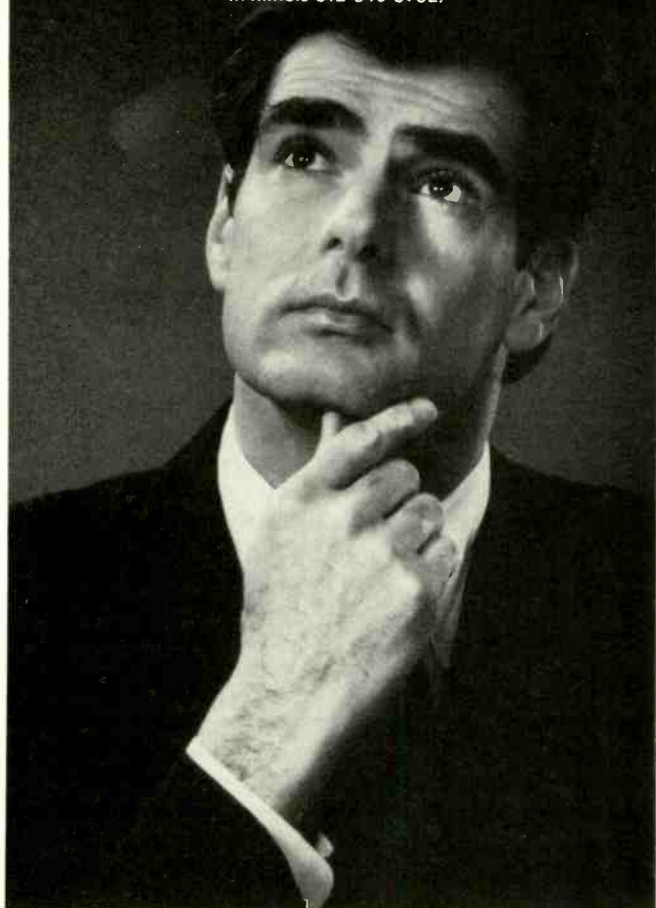
Once an applicant's quantitative integration credit is determined, the next step is to check out any applicable "qualitative" factors which might be involved. This is where things get a little tricky, since this calls for a separate evaluation of each principal who is proposed to be integrated into station management. What you, and the Commission, are looking for in this qualitative evaluation are "enhancement factors." These could include such factors as minority racial or ethnic status; residence and/or active civic participation in the proposed community of license or within the proposed service area; female status; demonstrated sensitivity to minority issues; or past broadcast experience.

The "daytimer preference" mentioned above in connection with the diversification criterion is a recent addition to the list of factors entitled to qualitative enhancement credit. To qualify for it you have to have owned and operated (for at least three years) the daytime-only AM station in the community proposed to be served by the FM station. Further, you've also got to commit to divesting the AM station within three years of commencing operation of the FM. For all of this, though, you are entitled to a strong qualitative preference which is roughly the equivalent of a minority-status enhancement.

It is important to note that an applicant can claim credit for qualitative enhancements only to the extent that its owners are proposed to be integrated. Further, qualitative integration enhancements cannot override clear quantitative integration superiority. Thus, for example, an applicant proposing 100 percent integration would be preferred over an applicant proposing only 50 percent integration even if the former were entitled to no qualitative enhancements and the latter were entitled to every conceivable enhancement.

Obviously, in order to assure the best possible comparative position, many applicants try to maximize their integration proposal both quantitatively and qualitatively. This can be done even where not all of an applicant's principals will be willing or able to participate in the full-time management of the station, usually through devices such as limited partnerships or the issuance of nonvoting stock. For example, only voting stockholders (where the applicant is a corporation) and general (as opposed to limited) partners (where the applicant is a partnership) are included in the calculation of an applicant's quantitative integration proposal. Thus, if an applicant were a limited partnership consisting of one general partner and 10 limited partners, and if the general partner proposed to be integrated full-time, the applicant would be entitled to 100 percent quantitative integration, irrespective of the fact that the remaining principals were not to be involved at all in the operation of the station.

To advance a strong integration proposal, an applicant might indicate in its application that it is a limited partnership, and that only its general partner(s) will be involved in the operation of the station. During the hearing, however, the partnership's principals would almost certainly



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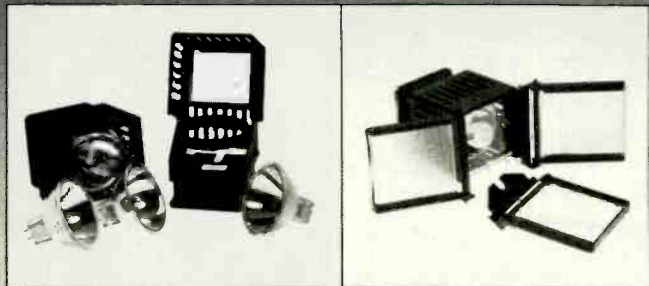
Lighting Tech Tips

THE PROBLEM...

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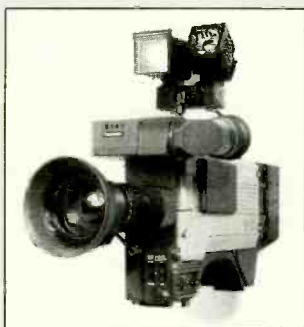
Bulbs: The most popular and versatile are the three-way focusable 12-14 volt spot bulbs which are available in 25, 50 and 85 watts (bulbs available up to 200 watts). The highly efficient UltraLight 85 watt is perfectly matched for daylight face fill or long distances, and can provide more illumination than a standard 250 watt portable. All low voltage bulbs can also be powered from 120V and 240V with the optional compact UltraLight AC Power Supply (ULAC).

Wide Angle Adapter: The swing-away adapter instantly changes these spots to a highly efficient and exceptionally even flood pattern. The 25 watt UltraLight with the Wide Angle Adapter is perfectly matched to most indoor interviews providing excellent subject-to-background balance at only 1.7 amps. That's over 2 hours of light from a standard 4 AH battery.

Diffuser: This swing-away optical adapter allows most of the punch of the spot bulb to come through (only 1/4" stop down) but softens and spreads the edges of the spot beam pattern.

Swing-Away Dichroic: Provides daylight color temperature with any UltraLight. The 85 watt UltraLight with Dichroic can produce a full f 8 of face fill at 5 feet.

UltraLight's tilt head feature can be used for bounce lighting, and the Dual UltraLight can be used for direct and bounce lighting simultaneously, while offering a choice of light power at the flip of a switch.



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FCC RULES & REGULATIONS

be subject to extensive cross-examination by opposing attorneys with respect to the details of the division of labor. If the opponents can demonstrate that the limited partners have, in fact, been very active in the formation and activities of the partnership, they may be able to argue that the limited partners should be treated as general partners, thus diluting the strength of the integration proposal. Similarly, suppose one of the applicants already has another station but, to avoid a diversification demerit, it has proposed to divest itself of that station. That applicant's opponents may, during cross-examination, attempt to demonstrate that that divestiture proposal was not made in good faith and will not, in fact, be realized. If that argument is successful, the applicant could be accorded a diversification demerit.

The hearing

The whole idea behind an adversary, trial-type hearing is to give all the parties an equal opportunity to test the strengths and point out the weaknesses of each other's cases. This process of testing can very easily take you by surprise if you are not expecting it. If you are a competing applicant in a hearing, your opponents will have the right to ask you a wide range of questions relative to almost every minute detail of your proposal. They will be permitted to press hard on you during cross-examination to see how familiar you are with your own proposal and how committed you are to effectuating it. If you have applied as part of a corporation or a partnership, your opponents will likely delve into the formation and the inner workings of the organization. They will have access to many documents (like your articles of incorporation, partnership agreement, minutes of meetings, and even possibly some internal correspondence). In short, as a competing applicant you lose much of your privacy, and you will often find yourself undergoing a grilling, on the witness stand, at the hands of a number of lawyers.

The bottom line

The bottom line on all this is: yes, it is fairly easy to scope out the Commission's rules and policies and to design a competing application that will, on paper, appear to be a sure winner but, no, merely doing that will not get you a license. The hearing process is intended to winnow out the serious contenders, and it frequently accomplishes that goal. If you are an applicant destined for a comparative hearing, you should be sure you know what you're in for. To get some background on this, you should talk it over in detail with your counsel, and you might even want to sit in on a few hearing sessions involving other applications, so that you can get the feel of a hearing. (Hearings are generally held in the Commission's hearing rooms in Washington; they are open to the public.) Hearings need not and should not be traumatic experiences for the participants therein. But, under the Commission's current rules, they are necessary experiences for competing applicants and, if you are going to be a competing applicant, you should be prepared.

BM/E

Introducing the Lexicon model 1200C income expander.

Our engineers call it the Lexicon 1200C audio time compressor. But many of our customers call it an income expander.

Working in precise synchronization with your variable-speed VTR, the Lexicon 1200C can shorten any television program for the insertion of extra commercials - without viewer-annoying scene cuts or squeaky voices. The 1200C actually compresses time without changing audio pitch, a technological achievement so significant that we won an Emmy* for it. And it's ready for stereo, too.

How much could your income expand? By adding just 60 seconds of extra commercial time per day, at \$600, you'd gain enough revenue in one year to pay for a Lexicon 1200C and still have more than \$200,000 in extra income.

And the 1200C can save you additional money when making commercials. If a take is great but it's a few seconds off, the 1200 can adjust it to the exact length needed, eliminating the expense of needless retakes.

Begin to see why the Lexicon 1200C is called an income expander?

For complete information, and to arrange for a demonstration, just contact us. Lexicon Inc., 60 Turner Street, Waltham, MA 02154, USA. Telephone: (617) 891-6790. Telex: 923468. Lexicon International, P.O. Box 122, 8105 Regensdorf, Switzerland. Telex: 59222.

We're ready to help expand your income.

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

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A dynamic TBC

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- 4x Subcarrier, 8 Bit Digital Sampling
- VARI-TRAK™ Operation for -1x to +3x Speed
When Used With Sony BVU-820®
- E-120 Interface for Digital Effects
& A/B Roll Editing
- Stand-Alone Heterodyne or 3.58 MHz Feedback
- Auto Trac 3™ Circuit to Steer VTR

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T-220 FIT™

Component design...keeping pace with the future

- Three Channel Component Processing for Clean, Transparent Performance
- Multiformat Capability
Inputs: 1/2" YIQ Type M™; Y688 Dub;
or NTSC Composite
Outputs: 1/2" Y, R-Y, B-Y Beta; Y688 Dub;
and NTSC Composite
- VARI-TRAK™ Operation for -1x to +3x Speed
When Used with Sony BVU-820®
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without Advanced Sync
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Southcentral, Steve Krant (214) 644-0232
Southeast, Jerry Rankin (404) 979-4437
West, Daniel Sofie 1-800-243-1570

Circle 195 on Reader Service Card

broadcast EQUIPMENT

Broadcast/ Telephone Coupler from DAC

Dakota American Communications of Bismark, ND, has a new broadcast/telephone interface equalizer-amplifier.

The DAC COM A.T.S. (Amplified Telephone System) utilizes an integrated circuit for amplification coupled to a high-frequency boost section. Interfacing with phone lines is accomplished through a capacitor circuit that includes MOV (Metal Oxide Varistors) transient protectors.

The unit is currently in use in radio newsrooms for recording and exchanging actualities; in sales departments for playing spec commercials over the phone to clients; coupled to portable audio mixers for live commercial and sport remotes; in control rooms for live call-in interview programs; and in production rooms to record local hospital, live-stock, and weather service reports.

The four-inch by six-inch sloped-front unit is available immediately at a cost of \$176.50.

Circle 250 on Reader Service Card

Aston Features New Character Generator

Aston Electronic Designs Ltd. of Great Britain has begun delivery on the next in its line of character generators, the Aston 4.

The Aston 4 features a multiplane display, 4096-color palette, multi-colored logos, 24 displayable colors per page, diagonal writing, overlap and superimposition. A potential library of over 1500 typefaces were developed in conjunction with a major type supplier; all are fully anti-aliased and can be displayed in any size from 10 to 100 TV lines. There are also five typeface masters that can be used to manufacture many sizes, with or without edging and

drop shadow.

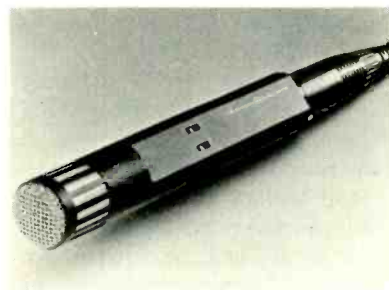
The Aston 4 also has a disk management system that allows display instructions to be recorded with each page, disk copying at the stroke of a key, and a "help" feature. A dual-channel system will be available with single or dual keyboard, and options are by plug-in circuit boards.

The Aston 4's effective resolution is 10 nanoseconds. First delivery was to a British graphics company, and it will be featured at October's SMPTE show. The character generator will be available early next year at a price of \$41,000.

Circle 251 on Reader Service Card

Sennheiser Has New Microphone

Sennheiser has introduced the MKH 40 P48 studio condenser microphone, which combines a symmetrical capsule with optimal resistive



loading.

The MKH 40 has a cardioid directional pattern. Frequency response is 40-20,000 Hz, and sensitivity is 25 mV/Pa (8 mV/Pa) \pm 1 dB. It is powered by 48 \pm 4 V dc, 2 mA, and weighs 100 g.

Circle 252 on Reader Service Card

QSI Introduces Color Bar Generator

The PSF-777 battery-operated split-field color bar generator from QSI has eight character user programmable video identification in the black block of the split-field bar pattern.

Provided with a 1 kHz audio test tone output, the PSF-777 can be powered by most common camera/VTR 11-15 V dc batteries, and includes a flashing ID or constant display that is internally selectable. Audio output is -56 dB, 150 ohm



balanced; 0 dB, +4 dB, +8 dB, at 600 ohm balanced.

The PSF-777 comes with an optional transistor battery pack with 115 V ac power adaptor, and is priced at \$995.

Circle 253 on Reader Service Card

New ENG/EFP Lenses from Fujinon

Fujinon has introduced a new long lens for 2/3-inch format cameras and three "weatherized" replacement lenses.

The A44x9.5ESM is a studio field lens which zooms out 26 times with no loss of aperture. It maintains a maximum f/1.6 from 9.5 mm to 249 mm. At the full 420 mm position, the aperture is f/2.8. A built-in 2X extender brings the range out to 840 mm.

A new A22x12.5ESM replaces a previous model. It offers f/2.0 maximum aperture and built-in 2X range extender but is more lightweight. The circuit board and wiring are protected by a removable plastic shield against the elements. The range is 12.5 mm to 275 mm, and with extender from 25 mm to 550 mm.

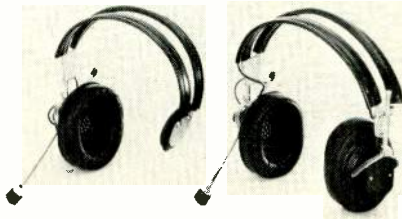
Two other weatherized lenses from Fujinon are replacements of last year's models. The A17x9ERM

and A14x9ERM are smaller and lighter than their predecessors and are protected with rubber gaskets and a plastic shield. Both also have 2X extenders. The A14xERM has a range of 9 mm to 153 mm and with the extender from 18 mm to 216 mm. For the A17x9ERM it is 9 mm to 153 mm or 18 mm to 306 mm with the extender.

Circle 254 on Reader Service Card

Broadcast Headsets from Shure

The SM1 and SM2, two professional broadcast headsets from Shure Brothers, are designed for news and sports broadcasting, special events



remote announcing, interviewing, and intercom systems. The SM1 features a single earphone, while the SM2 has a double earphone.

The microphone in both the SM1 and SM2 is a close-talking unidirectional dynamic with a frequency response of 50-15,000 Hz. Both headsets are furnished with a detachable cable having two shielded conductors for a balanced-line low-impedance microphone output. The SM1 has two unshielded conductors for the 2000 ohm earphone, while the SM2 has three unshielded conductors for its two 2000 ohm earphones. A detachable cable for both microphones allows total flexibility. An accessory microphone wind-screen is also provided with both handsets to protect against wind noise and explosive breath sounds.

The SM1 is priced at \$175, while the SM2 lists for \$200.

Circle 255 on Reader Service Card

Varian Introduces VHF Power Tubes

Varian EIMAC has unveiled four new VHF power tubes designed for power amplifier applications: the 4CX1500BC, 3CX2500D3, 3CW1750A7, and Y-842A.

The tubes include liquid-cooled models that use highly efficient heat exchangers to significantly reduce the coolant flow requirements.

The 4CX1500BC is a ceramic-to-metal, high-gain power tetrode for service in VHF TV and RF linear power amplifiers. It is forced-air-cooled with an anode dissipation of 1500 Watts. The 3CX2500D3 is a radial beam power triode for use in RF CW power amplifiers. The 3CW1750A7 is designed for cathode-driven class AB2 or class B RF amplifiers up to 110 MHz. The Y-842A uses the new high efficiency cooling design to provide a 7000 W plate dissipation high-power RF CW amplifier/oscillator.

Circle 256 on Reader Service Card

HME Wireless Mic System

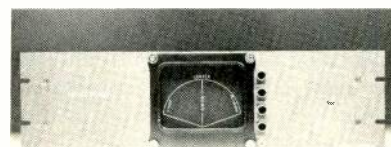
HME Inc. has introduced a new portable wireless microphone system for ENG/EFM and other applications. Virtually any mic can be used with the new System 820, and due to RF shielding and filtering improvements, up to 20 systems can be used compatibly.

The System 820 incorporates HME's Dynamic Expansion II, which allows a useable dynamic range in excess of 115 dB and full frequency response. The system features an ultra-compact transmitter and battery-powered receiver which can also be powered by external dc or available ac adaptor. An "Auto-Lok" discriminator tracks the transmitted RF signal to minimize audio distortion and improve captured ratio performance.

Circle 257 on Reader Service Card

B&B Systems Develops IMAGESCOPE

IMAGESCOPE is a single instrument that gives a true representation of a stereo audio signal. It displays



the signal graphically, showing the actual dispersion pattern of the sound energy as it will appear in a typical listening environment.

IMAGESCOPE's versatility allows it to be used for recording studios, audio production and post-production facilities, TV stations and AM radio stations. In recording and production, IMAGESCOPE is used to position any track or tracks in the stereo image in real-time, avoiding stereo phase errors. It can also be used at transmission sites to verify separation and/or mono compatibility.

Circle 258 on Reader Service Card

MCG Has New Surge-Master

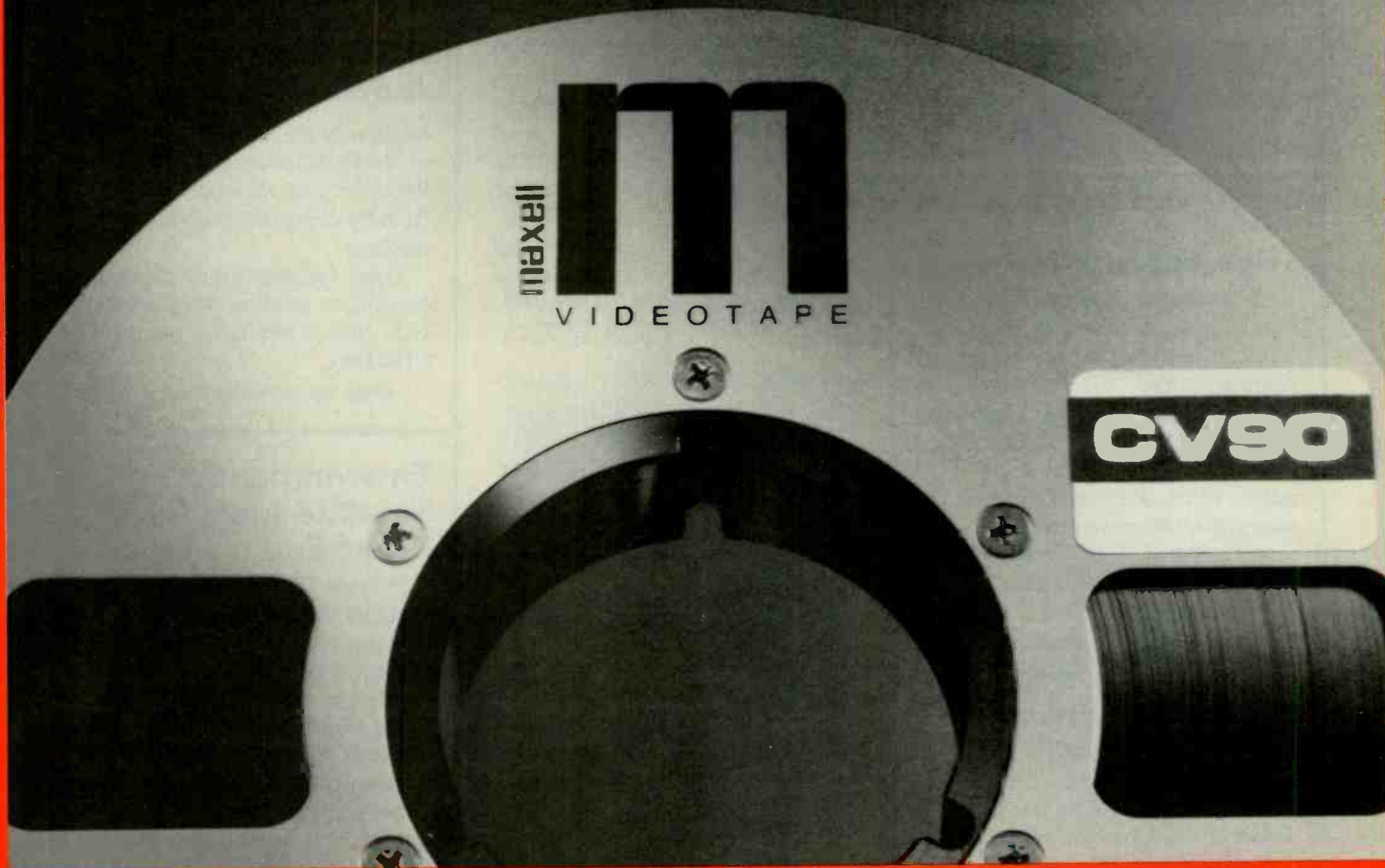
The Surge-Master heavy-duty protectors from MCG Electronics shield broadcast equipment systems from lightning and transient overvoltages. They employ both high-speed silicon suppression,



which absorbs the lesser transients and the leading edge of larger transients, and MOV technology, which reacts rapidly to absorb the brunt of the strike.

With three suppression modules on each line, the Surge-Master provides protection by insuring it with triple redundancy. Front panel status monitoring indicates the exact status of the unit at all times. In the event of severe damage to the Surge-Master, a red light indicates that there is an internal fault. A resettable "Event Counter" logs the number of transients that have been suppressed.

The Surge-Master is available with capacities from 100 to 5000 Amps; for 120, 240, and 480 Vac;



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Maxell perfects the 1" tape.
Introducing Maxell Broadcast Quality 1". Superior videotape technology to satisfy the perfectionist in you.

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Maxell's exclusive epitaxial formulation provides clean, dropout-free video, with RF output consistent to within 0.2dB from head to tail. We've even licked the stiction problem, with uniquely

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Give me an inch.

- Give me more information on Maxell Broadcast Quality 1".
- Give me the name of my nearest Maxell Distributor.
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BM85-9

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Circle 259 on Reader Service Card

Kodak 16 mm High-Speed Film

Eastman Kodak has introduced a 16 mm high-speed color negative film, 7292, that improves imaging characteristics.

The 7292 film features improvements in image sharpness and grain structure, with a recommended exposure index of 320 in 3200 K tungsten light. Its new emulsion will replace Kodak's high-speed 7294 film. The new film will be available worldwide in early 1986.

Circle 260 on Reader Service Card

Schneider Lens for Tube Cameras

Schneider Corporation has introduced the TV80, a high-resolution lens for 2/3-inch tube cameras.

The TV80 has a 17X zoom range and built-in 2X extender, and features a wide viewing angle, high-resolution optics, and a rugged design. Its focal length ranges from 8.5 to 150 mm with f/1.4 maximum aperture.

The lens can be supplied with an optional test pattern diascope, and is available for Sony BVP-360, Hitachi SK-970, Philips LDK-26,



and Ikegami HK-323 2/3-inch tube cameras.

Circle 261 on Reader Service Card

Mitsubishi Digital Audio Recorder

Mitsubishi has introduced the Model X-850 32-channel Digital Audio Recorder with cut and splice facility, fully compatible with the X-800 machine.

Used for multitrack digital recording at studios throughout the U.S., the X-850 has a list price of \$170,000.

Circle 262 on Reader Service Card

Environmental Satellite Introduces Front End

The Front End from Environmental Satellite Data is a new weather data processor. It allows broadcasters to collect and process ESD high-resolution weather images and the NWS Domestic Data on an unlimited basis from the Zephyr Satellite Transmission Service off Galaxy 1.

An unlimited use of ESD color satellite and weather images, NWS

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Reader Service Card.

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EDITING CONSOLES

No matter what VTR equipment you use, Winsted offers Editing Consoles to match your requirements! Our designs are based on consultations with professional users like yourself.

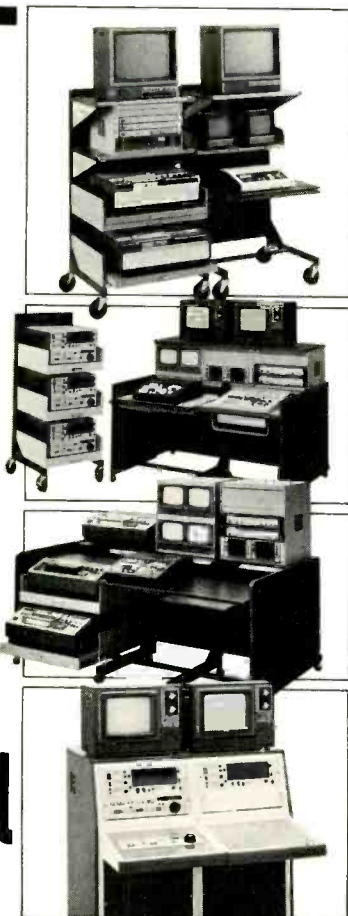
You've chosen your VTR equipment carefully, to meet your specific needs. Now choose the Editing Consoles that fit your equipment - quality consoles from Winsted.

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690 "ET" Everything Timecode

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- Orange Bus Compatible



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Put Millions of Dollars in Television Audio Technology to Work— For Only 22 Cents



Get a **FREE** Audio Needs Analysis from Neve for the cost of a stamp.

If you're about to make some very important decisions concerning your audio equipment, we'd like to help—at no charge and with no obligation. And with systems beginning at under \$10,000, anyone can take advantage of this offer.

For twenty-five years Neve has maintained its reputation as the leader in audio mixing console technology. We've crossed the hurdles other manufacturers are just reaching and we've reached the heights others will probably never achieve.

That's because, for our total history we've worked hard in the lab and the field to create superior consoles, perfecting the quality of the sound you hear and inventing newer, better and more cost-effective ways to process it.

So stop for a moment. Fill out our questionnaire and return it to our Connecticut headquarters. Or call us. We'd like to hear from you. Remember, there is absolutely no obligation.

Neve

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 ● NEVE ELECTRONICS INTERNATIONAL, LTD. Cambridge House, Melbourn, Royston, Hertfordshire, SG86AU England Phone (0763) 60776

Circle 199 on Reader Service Card

NEVE QUESTIONNAIRE

For a **FREE** Neve audio needs analysis, please fill out the following questionnaire and return it in your company envelope to: Rupert Neve, Inc., Berkshire Industrial Park, Bethel, CT 06801.

(NAME) _____

(COMPANY) _____ (TITLE) _____

(ADDRESS) _____

(CITY) _____ (STATE) _____ (ZIP) _____

(AREA CODE) _____ (PHONE NUMBER) _____

Position (please check):

- corporate/management
 technical/engineering
 producer/user
- I recommend console purchases.
 I approve console purchases.

Please check the description that applies to your studio:

- television broadcasting
 video production
 video post production
- jingles/commercials
 film
 multitrack recording

Audio Operations Personnel:

- all staff
 staff & freelance
 all freelance

Number of console inputs required:

mono (mic/line) _____ stereo (line) _____

Number of console outputs required:

stereo _____ mono _____ AUX/FB/cue _____

multitrack (TKS) _____

Console Operation Format:

- mono
 all of above
- stereo
 multitrack

Need Automation? Yes No

Current Mixing Console(s) (please list): _____

Please Check:

- Yes, I wish to buy a new mixing console. When? _____
 Yes, I would like a free analysis about my studio's console needs.
 Send info for file only.

My Budget for a New Mixing Console is Approximately:

- \$9,000-25,000
 \$25,000-50,000
 \$50,000-75,000
- \$75,000-100,000
 \$100,000-150,000
 \$150,000+

We would like your opinion as to the importance of the following on a scale of 1 to 10:

- Ease of operation
 Sound quality
 Brand name
 Expandability
- Reliability
 Manufacturer back-up
 Other _____

Additional comments: _____

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Marti has a complete line of STL systems and Mobile Relay and Fixed Relay RPU systems priced to save you money. Call or write for our complete product catalogue.

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Cleburne, TX 76031 Phone (817) 645-9163

Circle 200 on Reader Service Card

Domestic Data Circuit, and NAF-AX or DIFAX will be introduced with the Front End system for just \$995 per month, including transmission costs.

The Front End operates on an IBM XT and will interface with ColorGraphics, Chyron IV, Dubner, Vidifont V, PMT-100, McInnis-Skinner, and Alden systems. Cost is \$8600 plus installation and training.

Circle 263 on Reader Service Card

Pegasus 5100 from A.F. Associates

The Pegasus 5100 System from A.F. Associates, developed by Pegasus Systems Ltd. in the U.K., automatically processes the compilation of commercials and other short-duration tapes using advanced digital computer techniques.

The 5100 is being offered to television stations, cable systems, and advertising agencies.

Circle 264 on Reader Service Card

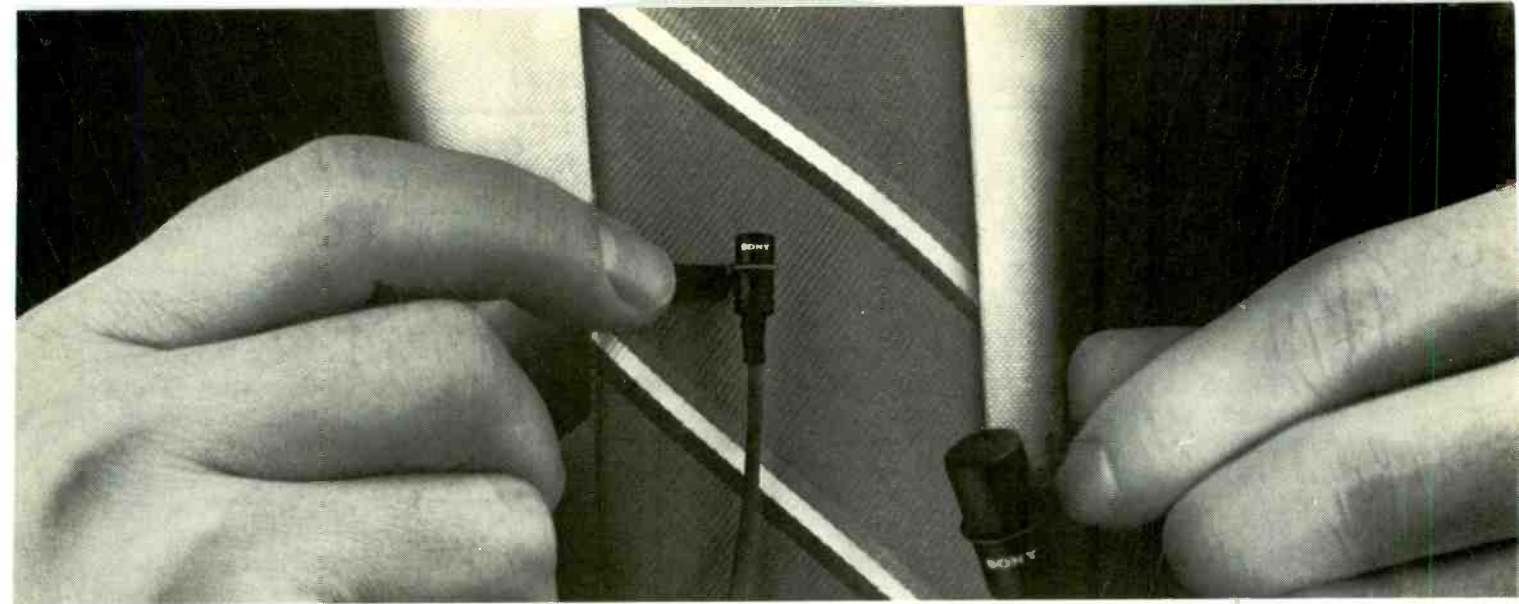
Convergence Expands Video Editing

Convergence Corporation has announced the introduction into its product line of the 204T/LMS package, which includes the Compaq personal computer.

The Convergence Model 204, an off-line/on-line, A/B roll, list management video editing system, is now available at a special package price first introduced at the 1985 National Association of Broadcasters Trade Show.

At a cost of \$30,000, the 204T/LMS includes the 204 Edit-Controller, three VTR interfaces and one SWI (production switcher interface) of the customer's choice, a time code reader with three reader cards, a status monitor, a Compaq IBM/compatible personal computer with two built-in disc drives powered by a Convergence PC-300 (MS Dos based) software program — and an Okidata printer.

The Compaq offers a double-sided floppy disc storage capacity of 4400 edit events in each drive, the ability to title disc files and enter comments in-



THE ONLY COMPANY THAT DIDN'T HAVE TO IMPROVE ITS LAVALIER MICS JUST DID.

As the world's leader in lavalier microphones, we've just taken some very important steps to ensure that we retain that distinction.

For one, we've taken our mics in a new direction with the addition of the Sony ECM-66 unidirectional. Its wide-angle cardioid pattern provides better off-axis frequency response than the classic pattern—while also providing an unprecedented level of isolation from ambient noise.

We've also made the least of a good thing: The new ECM-77 is the smallest microphone in Sony history. We've even made our new cable housing smaller—and more durable.

We've made more of some good things, too. The new ECM-55, for one: the latest refinement of our successful ECM-50 series.

And we've expanded our line of accessories—with new color windscreens; pencil-type, safety-

pin and necklace-type clips; and a power supply holder that clips to your belt.

Sony lavalier microphones operate on either a single AA battery or phantom-power. You also have a choice between black or satin-nickel finishes; and XLR, pigtail or Sony wireless-compatible output configurations.

So to see (barely) and hear (very clearly) the results of Sony's refusal to rest upon its laurels, call your Sony representative: Eastern Region, (201) 368-5000; Southern Region, (615) 366-0333; Central Region, (312) 773-6000; Western Region, (213) 537-4300. Or write to

Sony Professional
Audio Products,
Sony Drive,
Park Ridge,
NJ 07656.



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SONY
Professional Audio

to the edit list from the 204 keyboard. More importantly, the system prepares customers for more advanced list management programs such as Trace, post-production budgeting and programs offering total approaches to shooting script and edit list manipulation.

The 204T/LMS package is available immediately through Convergence dealers throughout the nation.

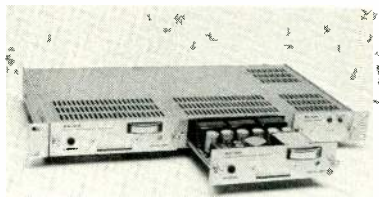
Circle 265 on Reader Service Card

The Bonneville DA-106

Bonneville introduces the newest member of its family of high-quality audio distribution amplifiers—the stereo DA-106.

The DA-106 employs computer-aided techniques to model the in-circuit response of exceptionally high quality audio transformers. The result is a product with very transparent audio characteristics and a near-zero failure rate.

The DA-106 has slide-out modules to allow customizing for specific needs. 600-ohm outputs can be selected for driving telephone lines or a



choice of 600, 150 or 70 ohms can be made for in-plant distribution. The DA-106 works well to distribute audio or real-time SMPTE signals.

The DA-106 has been engineered for a new generation of broadcast audio quality and for the strictest needs in terms of reliability.

Circle 266 on Reader Service Card

Mobile Repeat Receiver from Marti

Marti Electronics has a new mobile repeat receiver which can provide a radio link from a remote broadcast site to the nearest telephone line.

The AR-10 replaces the RR Series receivers for mobile repeat applications the way the Marti BR-10 Series receivers recently replaced the RR

Series for base station applications.

The AR-10 is a compact VHF-UHF FM quality receiver. The receiver contains a sub-audible decoder which, when activated by the encoded signal from a handheld portable transmitter (RPT-2), automatically turns on the Marti RPT-15 or RPT-25/40 mobile transmitters.

When used with the handheld RPT-2 at a remote site, the system functions as a wireless broadcast mic which can feed a telephone line, audio mixer, recorder, or transmitter. The AR-10 has a built-in monitor speaker, test meter, dual-frequency capability tone decoder, noise reduction and ac power supply. It operates from a 12 volt vehicle or external 12-14 volt battery.

Circle 267 on Reader Service Card

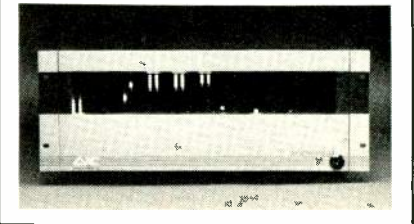
New Dominator Processor from Aphex

Aphex Systems has a new, multiband FM audio processor called the Dominator. The new unit uses many of the "intelligent" circuit principals from the highly acclaimed Compellor to produce the loudest, cleanest sound possible.

The Dominator incorporates several innovative processing techniques to achieve its loud, clean sound. Like the Aphex Compellor, the Dominator's tri-band compressors are truly program controlled, so the operating parameters are always correctly adjusted ... making the compression "invisible" at all times.

In the stereo generator, the Dominator uses the new Aphex MTH401 IC to greatly simplify and improve its circuitry, further adding to its openness.

The most innovative feature of the Dominator is the tri-band filter section. Aphex has eliminated old-fashioned, arbitrarily fixed filters, and uses sweeping, program controlled crossovers instead. These crossovers "read" the program material and continually adjust themselves for equal energy in each





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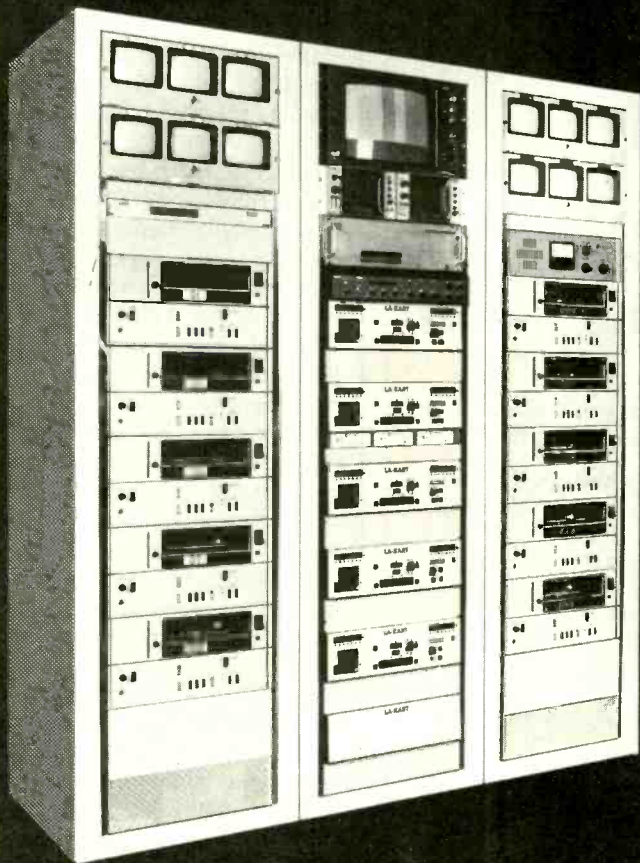




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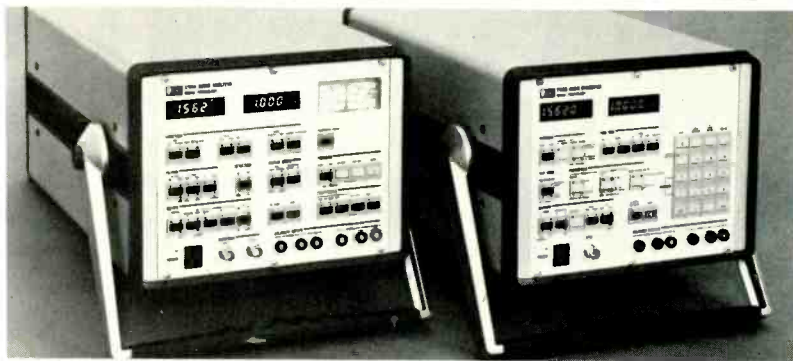
Circle 202 on Reader Service Card

band, resulting in minimal interaction between compressor sections.

The Dominator contains many other features such as full function LED displays to show important operating parameters at a glance, modular construction for improved reliability and easy servicing, and a compact high rack package.

Circle 268 on Reader Service Card

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



New Test Systems from Sound Technology

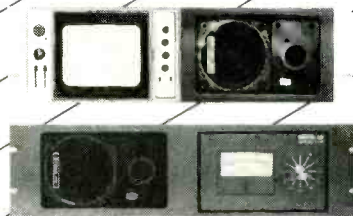
Sound Technology has introduced the 3000 Series of audio and transmission test systems designed for benchtop, field service, production line and remote testing. Maximum flexibility is provided by a separate generator and analyzer which communicate through the audio line being tested. The generator and analyzer have extensive front panel programmability allowing storage of entire automated test sequences such as proof of performances. This approach allows unmanned automated remote transmission line testing to be performed through any audio line being tested (i.e., microwave, satellite, or telephone transmissions) in typically less than 60 seconds, without usage of modems or external computers. Test results can be graphed on a standard printer or plotter. The 3000 Series can also be programmed with RS-232C or GPIB Interface.

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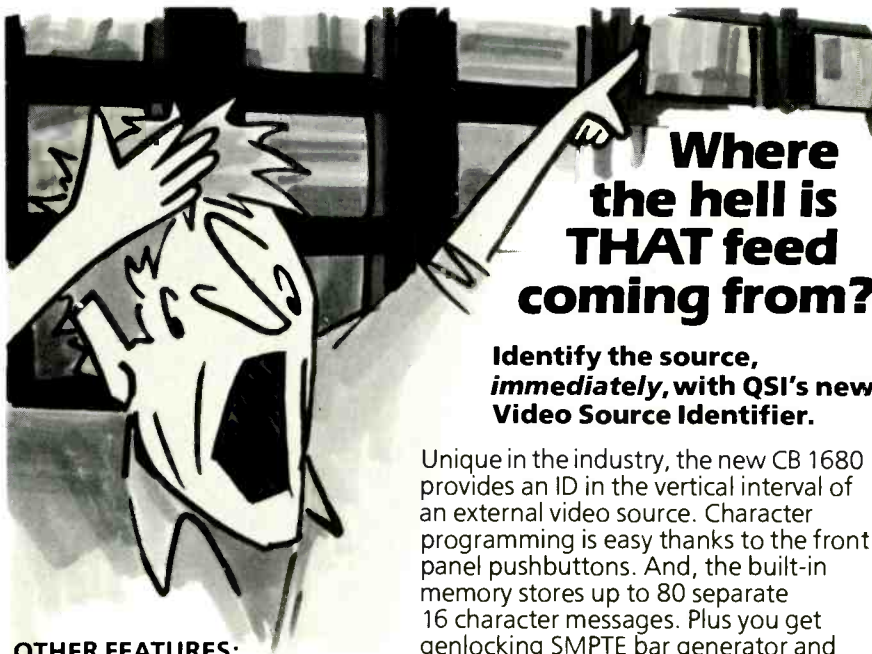
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BUSINESS BRIEFS



Members of video production house *Multivision of Needham, MA* in China recently to shoot a series of locations for *Sheraton Corp.*'s magazine program *Hello Sheraton*.

According to Joseph Scheuer, president of **Chyron Corp.**, the company wrote more than \$3 million worth of business at April's NAB Show. New products that generated substantial orders included the Scribe electronic text generator and the Chameleon high-resolution paint system Contrary to previously published reports in the trade press, **RCA** is not committed to incorporate **Nisus shutter technology** into its cameras, nor is Nisus committed to provide, sell, or license its technology to RCA. Previous announcements had incorrectly implied that such commitments existed.

Ampex Corp.'s Magnetic Tape Division has signed a multiyear contract to supply Burbank post-production house AME with a full line of one-inch, 197 3/4-inch, 187 standard U-matic, 101 Beta, and 102 VHS videotape In Texas, John Crowe Productions has commissioned **Shook Electronic Enterprises** to manufacture its second network facility trailer The Computer Products Division of **Panasonic** and **EECO** have agreed to a marketing arrangement for EECO's still-frame audio products, including its EECODER SES-300 Encoding System and VAC-300 Decoder, both fully compatible with Panasonic's TQ-2023F and TQ-2024F Optical Disc Recorders and Players The United States Patent and Trademark

Office has granted a patent for **CompuSonics'** Magnetic Storage System, which increases magnetic storage densities by a factor of over 100 on floppy and rigid magnetic disks.

In Alexandria, VA, **Atlantic Video** has added two new interformat edit suites and a new live control room, expanded its duplication capabilities, and added videoconferencing and film-to-tape transfer capabilities Cincinnati-based **Charlie Brown Music** recently opened an eight-track SMPTE interlock studio, the "Palm Room," and a MIDI-controlled "Synth Room." The Palm Room features an Allen & Heath Syncon B console, Otari MX5050 eight-track, and a specially modified MTR 12 1/4-inch four-track for audiovisual work. The Synth Room has a complete Yamaha DX7/QX1/TX816 system with a Roland SBX-80 for SMPTE interlock Production house **Recently Captured Live Productions** of Royal Oak, MI now offers dual edit rooms **Forecast Installations** has completed a film-to-tape, color-correction suite for New York City-based MasterColor.

Gentner Engineering, Salt Lake City, UT has successfully completed its first satellite communications system. The system was installed for Conus Communications of Minneapolis, MN **Alden Electronics** of Westboro, MA, and **Equatorial Communica-**

tions of Mountain View, CA have signed a multiyear agreement whereby Alden will purchase Equatorial's low-cost communication satellite earth stations and satellite broadcast network services. The deal is worth approximately \$1.4 million Via an ongoing agreement, **Modulation Associates** is supplying Ku-band satellite uplink and downlink equipment for Hubbard Communications.

A new company, **The ALTA Group**, has been formed in San Jose, CA to design, manufacture, and market a line of high performance digital television equipment for use in professional 3/4-inch and half-inch videocassette recording production applications. Founders include Wayne Lee, Michael Tallent, Ronald Long, and Frank Alioto **Quantel** has restructured its organization, changing its American name from MCI/Quantel to Quantel. It will also be establishing an east coast office in the U.S. in the near future. In addition, George Grasso now becomes chairman of the board, while Richard Taylor will take up the title of president. . . . **Data Communications Corp.** has consolidated its two largest groups to form the Media Services Division Seattle-based Broadcast Programming International (BPI) has changed its name to **Broadcast Programming** Herb Neu, formerly of CNN Radio, has left Turner Broadcasting to form a radio projects management company, **Herb Neu and Associates**. The company is based in Atlanta A new production and post-production house called **Rave Productions** has been formed in Hollywood **Lehr Communications**, a full-service video production company, has opened in St. Louis.

Among the personnel changes this month, Robert Cavanaugh has joined **Dolby Laboratories** as technical marketing consultant At **Fortel**, Tim Stockhaus has been named western regional sales manager **Ampex** has promoted Michael Wilke to marketing manager, videotape products Keith Bandolik has been named national sales manager at **Switchcraft**.

At **A.F. Associates**, Marc Bressack is the new manager of broadcast sales Greg Silsby has been named marketing manager of studio products at **Audio-Technica** Tom Kidd joins Hubcom as **marketing manager**.

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