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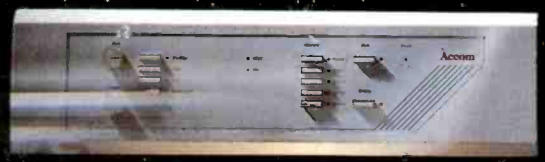
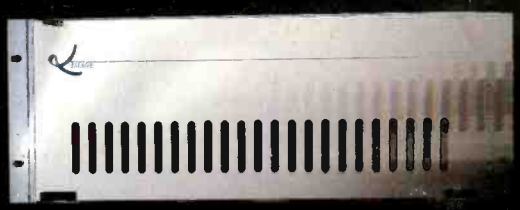
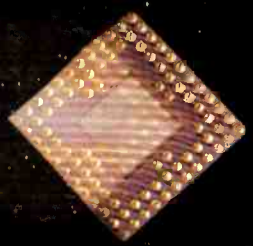
PLUS: STATION SPENDING SURVEY; TESTING RF; AUDIO FOR VIDEO GUIDE

Television Engineering

AN ACT III PUBLICATION $3.00 JULY 1990







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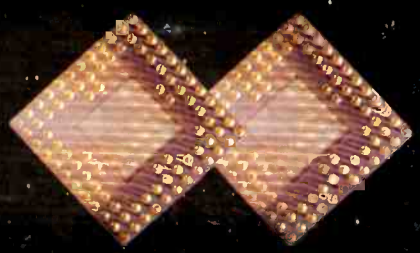

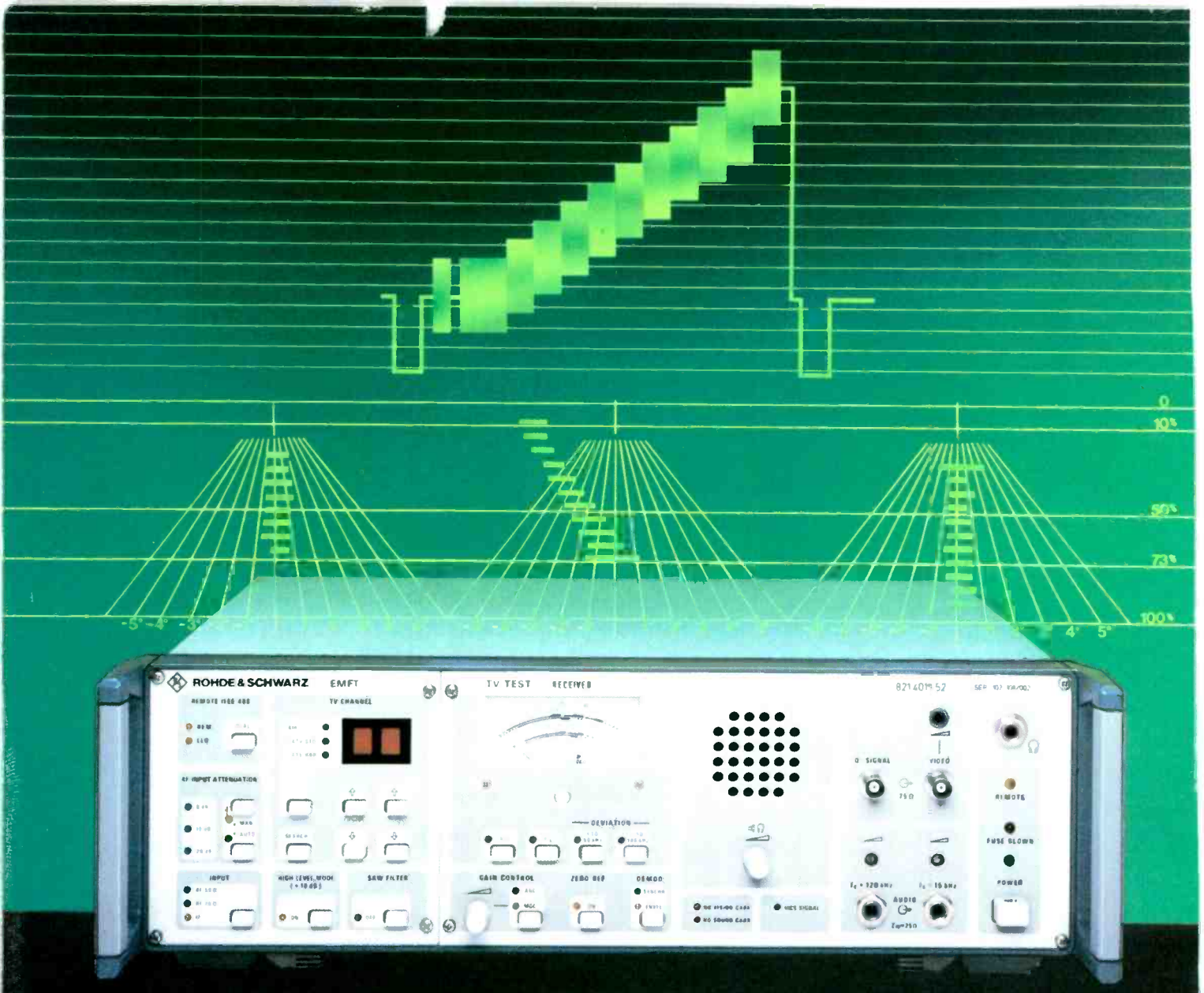

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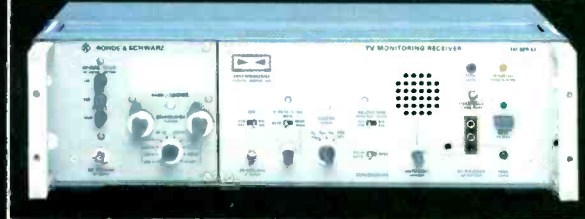

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BME's

Television Engineering

July 1990

Dear TELEVISION ENGINEERING Reader:

As you know, BME's TELEVISION ENGINEERING is written for television engineers and technical decision makers. Each month, it focuses its editorial on the needs of engineers in TV broadcast, teleproduction, cable, and corporate/institutional environments.

Because we'd like your feedback, comments, and input on the magazine, we're inviting readers like you to tell us in 50 words or less what makes TELEVISION ENGINEERING an essential read. What do you like most about the magazine? How does it help you in your job? How can it be improved to even better serve your needs?

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Yours truly,

Peter Caranicas
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These stations had to pay *us* to get on this list.

What we mean, of course, is that they all have purchased Ampex switchers, and we don't exactly give those things away. But what's more important is what the TDs and directors at stations like these are saying about our switchers...

"We can configure the switcher any way we choose, fast! Between live news and some spot breaks we have only 30 seconds to change TDs, directors, everything! With Century we can do it, with time for a sip of coffee to spare."

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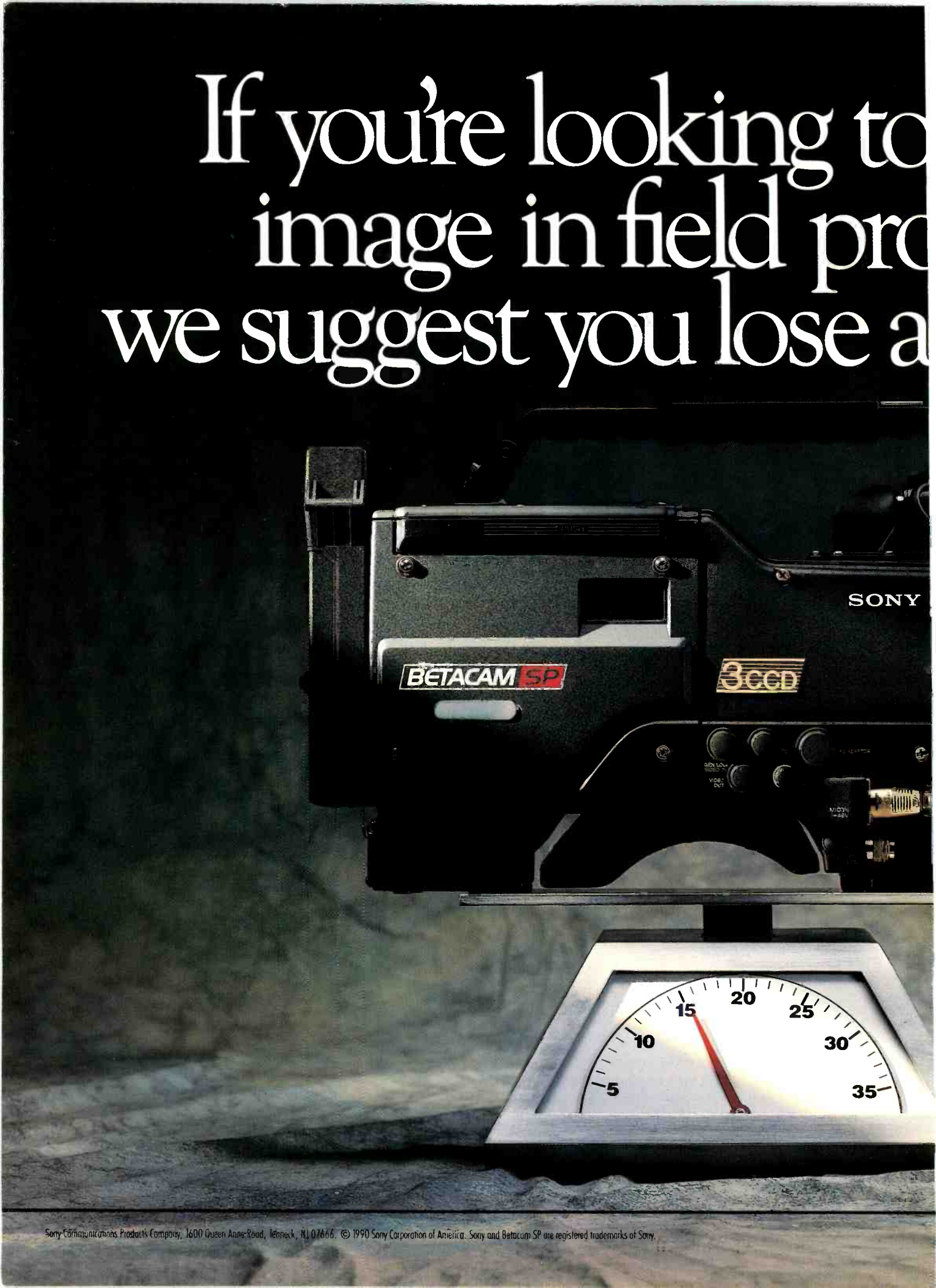

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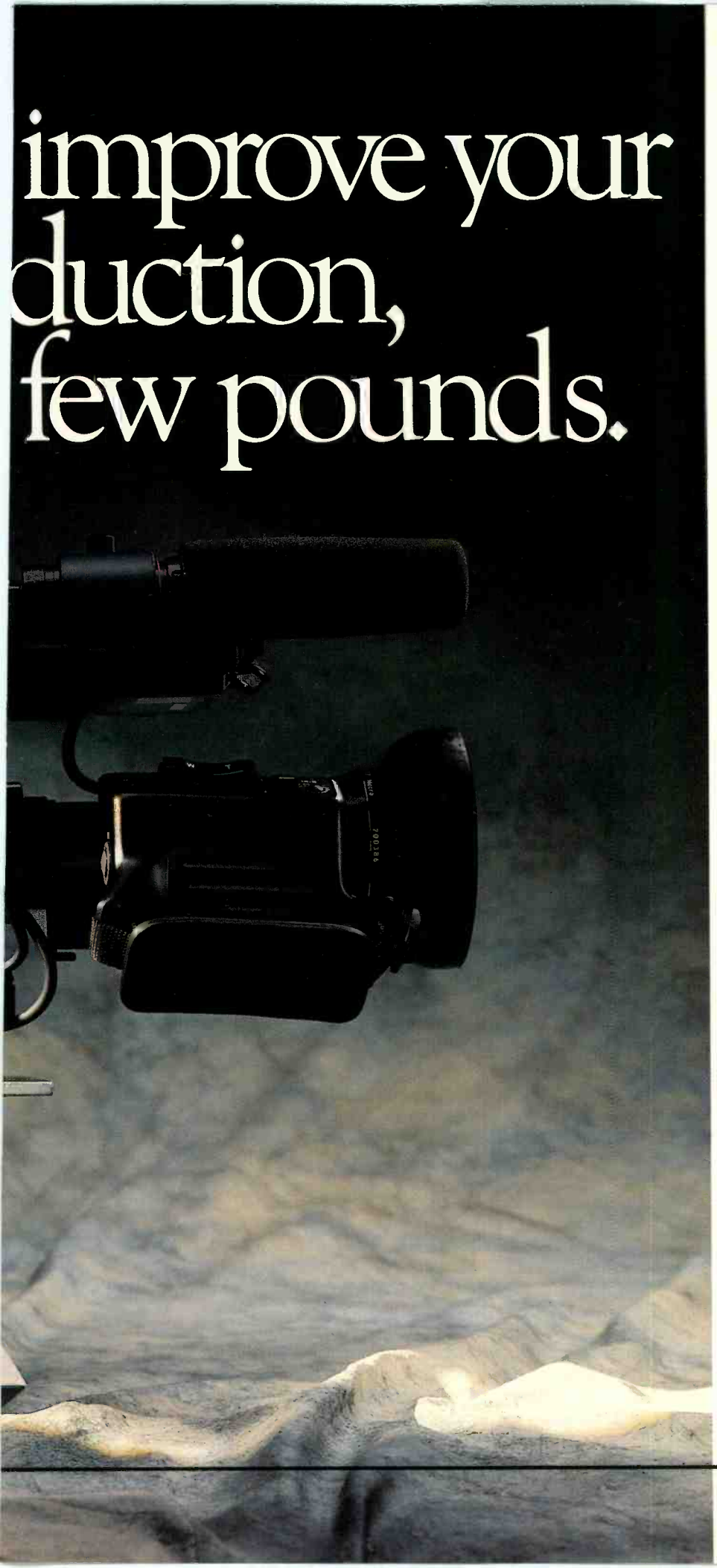

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All this performance in such an easy-to-handle package will give you a degree of creative flexibility that you've never had before.

Of course, when you consider Sony is the originator of one-piece technology, a camcorder this good should come as no surprise.

For more information about the BVW-400, call 1-800-635-SONY.

After all, while a camcorder should be designed to weigh as little as possible, its performance should never be taken lightly.

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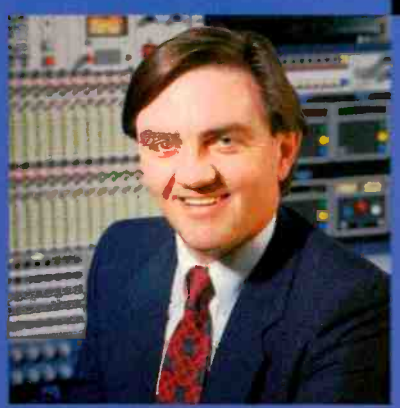

"Auditronics' 900 does just what we need for television audio,"

"and does it OUR way," says KDKA's Charlie Fagan. "Other manufacturers offered consoles, but they'd force us to conform to their way of doing things."

"Auditronics asked, 'What do you need to be able to do?,' and we told them. 'The 900 will do it,' they said. And it does. We wanted to be able to manage our Utah router with simple, one-button commands from the console. The 900 computer does that, and gives us 64 preselect setups, with switching from live-to-live, back-to-back, different studios, different wall boxes, all without missing a cue. And the router interface was a simple five-wire RS-232C hookup to the 900's computer," says Fagan.

"This Auditronics 900 is the best board the station has ever had," says Don Bell. "I especially like its physical layout; everything's easy to reach. It's got all the features I need, and some added touches other boards don't have."

Fagan says, "Auditronics' mix-minus lets us manage up to eight satellite feeds and assign them to any of 20 IFB circuits without tieing up aux sends or sub-groups on the console.

In short, the technicians working our 900 console love it, and when they're happy, so am I."

For information on the Auditronics 900 console Charlie Fagan selected for KDKA-TV2, call toll-free 1-800-638-0977. Do it today.

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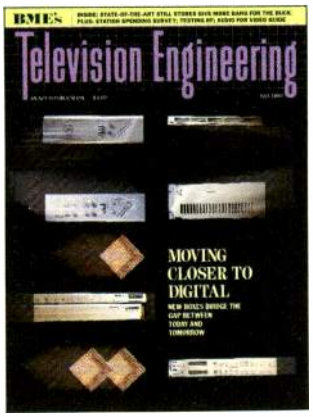
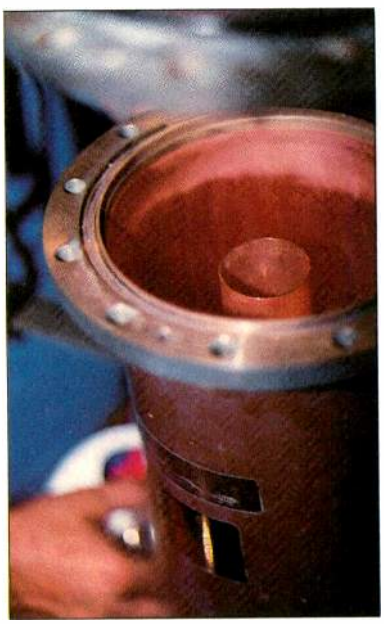


On the Cover:
Digital conversion devices. Left, from top: Accom 122; Accom 221; Sony chip used for error correction, encoding and decoding; Faroudja decoder and encoder. Right, from top: Abekas A20; Alpha Image 300; BTS XD DC decoder and CD 7 encoder. Photography by Marc Rosenthal. Story on p. 26.

33 *Color correction at the Post Group in Hollywood.*



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Television Engineering
JULY 1990 VOL. 26, NO. 7

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Attracting today's finicky viewers requires top-quality programming—and a top-quality signal.

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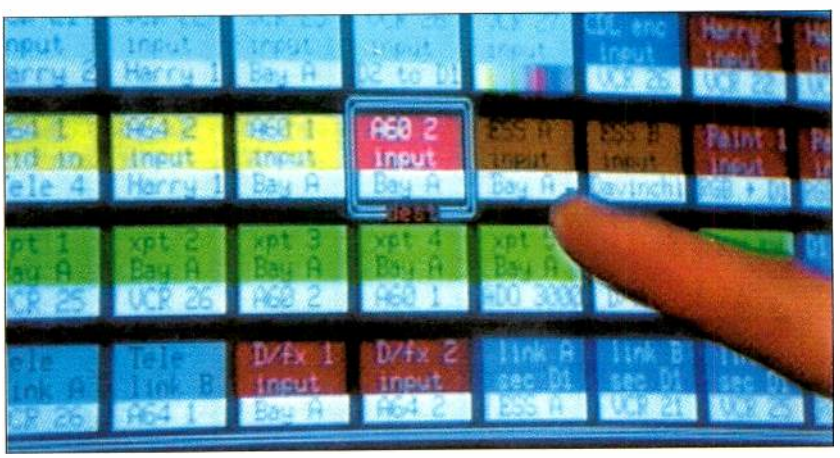

26 *Touchscreen-controlled routing switcher.*

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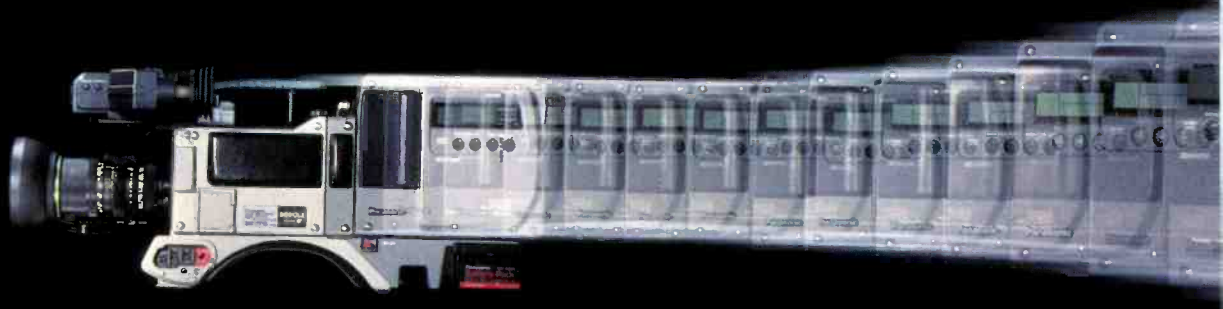

Panasonic® makes it easier than ever to carry away the performance of SVHS. By offering you the smallest, lightest and most versatile SVHS dockable VCR available. The Panasonic AG-7450. It delivers field recording with no strings attached.

Now you can combine the high performance of Panasonic's 300CLE, 200CLE and F70 CCD Cameras with the AG-7450. To create a one-piece SVHS camcorder system designed for one-person operation. Because everything you need for high performance field recording sits right on your shoulder. Which means greater mobility and flexibility when shooting. The AG-7450 can also be used as a stand-alone field recorder with an optional 14-pin VCR adaptor.

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Here are some of the major themes and features you'll find in **Television Engineering** over the next six months:

AUGUST, 1990

CLOSES 7/9

Imaging Technology Special

- Buyer's guide to digital video effects systems
- What to look for in color monitors

PLUS: NAB's best products; The UHF tube revolution; Station equipment buying patterns

SEPTEMBER

CLOSES 8/8

Double Theme: Mobile TV/Audio for Video

- SNG trucks in today's newsgathering
- AES preview: Sounds of the future

PLUS: Paint systems; Video test and measurement report; Inside a major New York post facility

OCTOBER

CLOSES 9/7

SMPTE Issue/Focus on Post-Production

- Annual SMPTE preview
- A new look at random-access editing

PLUS: New S-VHS products; Studio-transmitter links; Chicago teleproduction facility profile

NOVEMBER

CLOSES 10/9

RF Engineering/Studio Automation

- Transmitter newbuilds
- Buyer's guide to robotic camera systems

PLUS: New products from Video Expo; Florida TV studio profile; Interview with top technical decision-makers

DECEMBER

CLOSES 11/8

SMPTE Review/Focus on Digital Technology

- New products from SMPTE
- The coming of the digital studio

PLUS: Cart systems report; Inside a major cable network's facility; Educating TV engineers

JANUARY, 1991

CLOSES 12/7

Excellence in Engineering Annual

- Special issue: The 4th annual Excellence in Engineering Awards

PLUS: New SMPTE products, part II; Report on microwave systems

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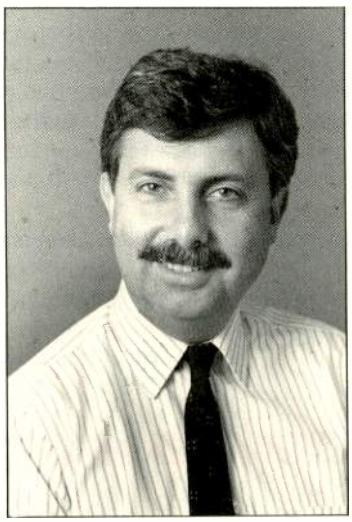
VIEWPOINT

Broadcasters today are paying for the excessive deregulation that marked the 1980s.



Ask 10 different broadcasters why they're in the doldrums, and you'll get 10 different answers.

Here are 10 at random: VCRs, negative Nielsens, pay cable, lousy programming, a slow ad market, basic cable, less leisure time, pay-per-view, Fox, and runaway programming and production costs.

We'd like to venture an 11th: deregulation.

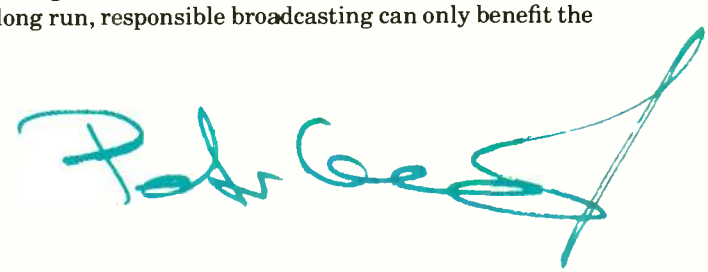
The wave of deregulation that swept government policy when the Reagan Administration assumed office encouraged a new type of investor and owner to enter the broadcast business. To them, station ownership was purely an investment, not the "public trust" stipulated by the Communications Act. Their motive in purchasing stations was to make quick profits on the heels of fast appreciation and a rapid turnaround. They had less commitment to their communities than to the corporate bottom line.

The elimination of station holding rules and the easing of restrictions on station ownership coincided with the availability of junk bonds coming from a similarly deregulated financial marketplace. The result: a frenzy of station trading. As *Television Engineering* technical editor Bill Owens points out in this issue's "Update" section, Drexel Burnham Lambert alone provided over $7 billion in financing for the broadcast and cable industries.

The loose regulatory climate of the '80s also allowed station operations to become highly leveraged—only to collapse under the weight of their own debt when harsh economic conditions returned. Stations owned by Milt Grant and TVX were the most visible victims.

But the '80s are over, and the '90s are starting off like the hangover after a wild party where money was the main intoxicant. In Washington, the HUD scandal has exposed enormous financial abuses that took place under the nose of a happily oblivious administration. And throughout the country, the massive collapse of the savings and loan industry exemplifies the worst that can result when regulators are shorn of their power—or look the other way.

Fortunately, the deregulatory craze has run its course, and the talk in Congress and the FCC now centers on *re*-regulation. We hope this new climate, coming in the wake of Drexel's collapse and the drying up of the junk-bond market, will lead to a resurgence of commitment to operating stations in the public interest. In the long run, responsible broadcasting can only benefit the bottom line.



Peter Caranicas
Editor in Chief

UPDATE

Tektronix's Friedley Resigns . . . . Sony Cuts D-2 Tape Price . . . . Milken "Guilty" Plea Not the End of Junk-Bond Woes . . . . Digital Microwave Focuses on Video With New Division . . . . The Weather Channel Offers Public Traveler Services

Television Products Are Not Part of the Tektronix Slump

Television products are selling well despite a general slump at Tektronix, according to a company representative.

The slump includes two waves of layoffs, revenue losses, and a decline in stock price. According to the *Wall Street Journal* (May 30, 1990), Tektronix took a net loss of $25 million for its third fiscal quarter ending March 3, and will take a $70 million charge against fourth-quarter earnings to help pay for restructuring the company. Meanwhile, stock prices are at an all-time low, according to the *Journal*, and 1,300 employees will be laid off by August. Those 1,300 join nearly 1,400 ex-employees who were cut by the end of the last fiscal year—and the total of 2,700 represents almost 20 percent of the Tektronix work force prior to layoff activity.

Among the departed is David P. Friedley, president and CEO of Tektronix since 1987. Friedley resigned under pressure from the board of directors because financial performance was not meeting expectations, reports Jeanine Navarra, a Tektronix spokeswoman. "The board of directors felt it was time for a change," she says. Robert W. Lundeen, chairman, will serve as interim CEO, and William D. Walker, a director, will be interim president.

"We expect to fill the position and hire a new president in three to six months," says Navarra, who adds that the company is searching both inside and outside Tektronix for a replacement. (Friedley had been promoted from his post as VP and general manager of the Communications Group.) "We are not excluding any discipline. We may hire a broadcaster, if he is the right person for the job. No decision has been made."

Navarra says that Tektronix's television industry products are doing very well, but that a soft market and poor financial performance in other areas has hurt business. In April, Friedley complained that Tektronix had been hurt badly by a downturn in the defense industry, a major customer.

In all the swirl of financial woes, a rumor began circulating that Sony was ready to take over Tektronix. Navarra says that Tektronix did talk with Sony about the Grass Valley Group, a prime Tek subsidiary. But no sale will take place because there was no agreement on price, reports the *Journal*.

As part of its restructuring efforts, Tektronix will merge the Communications Group into its Visual Systems Group. The Communications Group includes the Television Products Division and the Grass Valley Group subsidiary. Several of the company's other business lines will be shut down or sold.

Tektronix has a distinguished history. Founded 47 years ago, it made its name with the first oscilloscope, and then created the waveform monitor and the vectorscope. It received a handful of Emmy Awards for its technological advances—some of which were major factors in the creation of color television. At that time, Tektronix test and measurement equipment could be found in almost every broadcast facility in the world.

"We are very optimistic about the future, and about the ability of the people in place to get the job done," Navarra says. "In spite of the recent changes, our customers will not notice even a blip in service."

—Tom Soter and John King

Sony Cuts D-2 Tape Price 20 Percent

In a move aimed at overcoming a "barrier" to the purchase of D-2 tape, Sony Magnetic Products Company dropped D-2 prices in the U.S. by 20 percent as of June 1. Andrew Mougis, VP, Professional Tape Division, says that with D-2 tape almost two times the price of one-inch, "there appeared to be a barrier" to D-2 purchases.

Even with the pre-June price, demand for D-2 tape had been mushrooming, according to Sony. "Sony Magnetic Products has experienced dramatic growth in sales of D-2 tape," claims Mougis. Sony says the format is selling at 20,000 pieces a month this year—20 times the monthly figure for last year. Sony is hoping the price reduction will add fuel to the fire of U.S. demand.

Meanwhile, "pricing in Japan is much more closely aligned" between one-inch and D-2, according to Mougis, who says that prices for one-inch and D-2 there are

about the same. The U.S. prices for D-2 will now be about 1.4 times the price of one-inch. Mougis revealed to *Television Engineering* that Sony's ultimate goal is for D-2 prices to be on about the same level as one-inch worldwide. However, he says the recent price cut is a major move and will be "the last move for some time."

The Sony cut is bound to have an effect on pricing by other D-2 manufacturers. Mougis says it will "force other manufacturers to get in line" on pricing.

Sony, which has "greatly expanded metal-tape production over this past year," is ready for the expected increased demand for D-2, says Mougis.
—*John King*

Junk-Bond King Cops Plea As Broadcasters Face Funding Gap

"Because of the tremendous amount of publicity that has surrounded this case, I wish to make clear that my plea is an acceptance of personal responsibility for my own failings and actions, and not a reflection on the underlying soundness and integrity of the segment of the capital markets in which we specialized."

On April 24, 1990, with those words, Michael Milken pled guilty to six felony counts in the securities investigation which brought down Drexel Burnham Lambert Inc., the brokerage where Milken headed junk-bond financing operations.

For much of the 1980s, the names of Milken and Drexel have been linked with the type of financing called junk bonds, a high-risk financial instrument that depends upon rapid increases in corporate earnings or the sale of corporate assets to pay back the investors. With the death of Drexel, the market has closed what had been a major avenue of finance for the communications industry.

In the period 1985 to 1989, Drexel provided over $7 billion in financing for broadcasters and cable operators. Although it will take some time before the full impact of junk financing will be known, one need not look far to see the tip of the iceberg.

In mid-April of this year, the holders of junk bonds that were issued to finance the purchase of eight television stations by Univision Holdings agreed to accept an early redemption of those bonds. Included in that group are the holders of $165 million in junk bonds underwritten by Drexel, who will receive about 55.3 cents on the face-value dollar, for a total loss of over $73 million.

The majority holder of Univision is Hallmark Cards, which purchased the group of eight stations controlled by Spanish International Communications Corp. The purchase was fi-

People on the Move

Akio Kobayashi, new president of **Hitachi Denshi America**, aims to make the company more customer-oriented, and has plans to integrate video, image, communication and computer technologies . . . . John Storyk, internationally known studio designer and architect, is currently applying his talents at **Crawford Post Production** of Atlanta . . . . To help coordinate **DSC**'s sales efforts, **Chyron** now has its DSC digital sales group reporting to Lawrence Mincer, Chyron's VP, North American Sales. Meanwhile, Chyron sub **Aurora** named Katcha Burnett as its international sales manager, and Gary Attanasio as its Northeast regional sales manager . . . . **CEL Electronics** of Saffron Walden, England, has appointed F. Wesley Dixon to VP, U.S. operations in CEL's newly-established U.S. office in Kansas City, MO . . . . **Sony**'s Videoconferencing and Satellite Systems Division named Thomas Volk as its systems integration manager . . . . **Grace & Wild Studios** has promoted Patrick Mathews to film transfer supervisor, and added James Wilson to their film transfer staff . . . . The **NAB** has promoted Michael C. Rau to senior VP of science and technology . . . . William A. Winn, with experience as sound designer for PBS Great Performance specials and as senior audio engineer for "USA Today on TV," has joined **Atlantic Video**, Alexandria, VA as audio engineer . . . . Joe Allen, former publisher of **Act III Publishing**'s *Corporate Video Decisions*, is now executive VP at **Manis & Company**, a New City, NY advertising, marketing and public relations firm . . . . Coronado, CA resident Don Reynolds is commuting on the Coronado Bay Bridge these days to his position as product manager for **Dynair** of San Diego . . . . **Cable TV Laboratories (CableLabs)** recently made four personnel moves: Steven Dukes to project manager of advanced network development; Larry N. Lehman to chair of the Technologies for New Business Subcommittee on the CableLabs Technical Advisory Committee; Dr. Aleksander T. Futro to director of technology assessment; and Suzanne Nielsen to technical writer for the Labs' Clearinghouse . . . . Philip Lachapelle is the new Western regional sales manager, large-screen display products for **BARCO** . . . . **Rebo High Definition Studio**, New York City, appointed Thomas Leone account exec for NTSC sales. ■

Akio Kobayashi of Hitachi Denshi America.

nanced with junk bonds, with debt service to be approximately $52 million for 1989, raised to $79 million in 1991.

At the beginning of 1989, Univision was projecting a cash flow of $62 million. Actual cash flow for 1989 was just over $40 million, reflecting a shortfall in expected revenue growth. Univision was unable to meet cash interest payments, and by early April, Hallmark was threatening to place Univision into Chapter 11 if investors were unwilling to accept its proposed buyout of the bonds.

Univision is not the only broadcaster built on Drexel's junk bonds. Between 1985 and 1989, SCI Holdings, a six-station group held by George Gillett and the investment firm of Kohlberg Kravis Roberts, issued over $2 billion in debt instruments via Drexel. Recently, SCI obtained $160 million in debt concessions, and $40 million in new equity from its partners.

Other broadcasters with outstanding bonds underwritten by Drexel include: Turner Broadcasting, Viacom, Harte-Hanks Communications, Gillett Holdings and the Telemundo Group. And many others obtained similar financing through Drexel's competitors.

The use of junk bonds to finance station acquisitions has placed a considerable debt burden on many operators. Revenue growth is needed to pay the increasing cost of debt service. With no growth, or a decrease in revenue, stations must look to cut expenses in other areas to make up the difference.

One chief engineer whose station was recently purchased by an investment group told us that his new owners eliminated what had been almost a million-dollar-a-year capital budget, with most of that diverted to debt service. However, the investment community's increasing reluctance to support new junk-bond issues may signal an end to the station trading fueled by this type of financing.

—William A. Owens

Local Forecasts Go Public

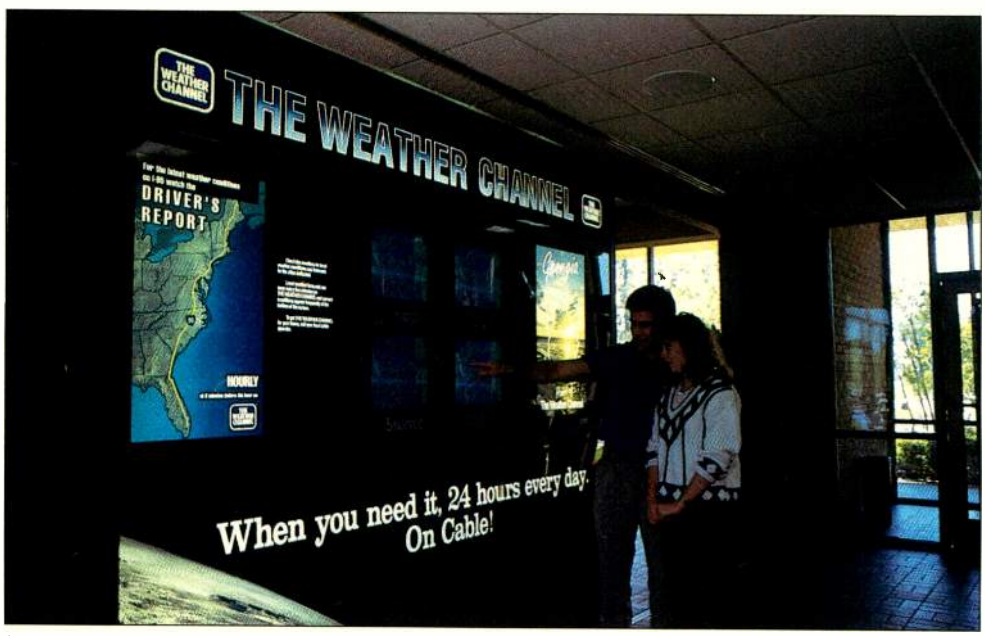
Using a computer-controlled transmission system, The Weather Channel broadcasts a national program that includes local weather updates every five minutes. Now The Weather Channel is using this technology to provide traveler services in Savannah, FL and Atlanta, GA.

At the Visitor Information Center on Interstate 95 South in Savannah, The Weather Channel has installed four monitors that show the national program as it is being carried in Savannah, Tampa, Orlando and Daytona. The Hartsfield Airport in Atlanta has an even more ambitious setup, offering the program as it is being seen in 12 different cities, including New York, Los Angeles, San Francisco and Miami.

The Weather Channel system addresses weather reports for specific areas to the particular cable carriers in those areas, so that each carrier receives only its own local forecast for the periodic updates. Several screens of data make up the regional update, including screens for current conditions, rainfall accumulation and long-range forecasts.

"I don't believe any other network is doing this kind of addressable programming," says Richard Roher, public relations representative for The Weather Channel. Information from several weather-data suppliers is accumulated in The Weather Channel's computer system on an ongoing basis, and sent up to its satellite, where each cable system extracts the information intended especially for it.

Roher says this addressable programming feature also lets The Weather Channel work with information provided by local and state emergency agen-



Visitors to Florida's Information Center can check forecasts for four Florida cities.

cies to give hurricane warnings or evacuation notices on the local forecasts.

Nielsen data puts the number of The Weather Channel subscribers at over 43 million. Besides 24-hour coverage of national and international weather, the station provides special reports on weather emergencies and offers regular feature programming, including documentaries. Landmark Communications, a Virginia-based media company, owns The Weather Channel, which was founded in 1982.

—John King and Alan Conyer

DMC Starts Video Division

Digital Microwave Corporation is specializing. The six-year-old company, which designs, manufactures and markets high-performance, short-haul digital microwave radio and fiberoptic communications products and systems, has set up a new branch—aimed at marketing products to the broadcast industry. Dubbed DMC Digital Video, the division will "focus on the concerns of broadcasters," says company spokeswoman Anita Bing. "So much of the television market is going digital," Bing adds. "At NAB, digital systems were everywhere. 'Digital' is a key word, and digital video is the market for the '90s."

James B. Murray will lead the way as VP/general manager of the division.

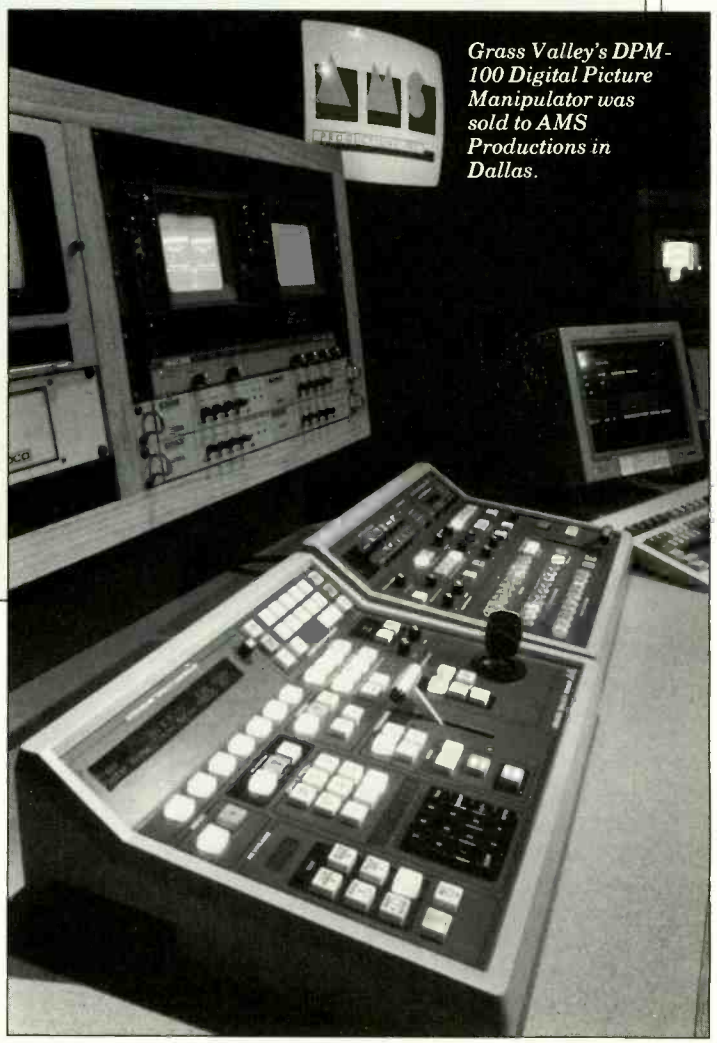
Company News

Electrohome Limited and **Microvitec PLC** are in the final stages of phase-in of their joint manufacturing/marketing agreement for world-wide supply and sale of video monitors . . . . **Q-Co Industries**, the North American operating division of **Cue Corp.**, acquired **O'Connor Engineering**, Costa Mesa, CA, a maker of camera support equipment . . . . **Tektronix** is forging deeper into the animation and imaging markets by agreeing to make **Media Logic**'s Artisan desktop presentation system available on Tektronix's XD88/30 and XD88/10 graphics workstations. The Artisan system features windowing, 16.7 million colors, zoom, pan, flip, scale, rotation, and graphic primitives . . . . **Pacific Video**, Hollywood and **Dome Productions**, Toronto are getting together to license Pacific Video's Image Translation technology in Eastern Canada. The Image Translation process converts filmed TV programs from NTSC to PAL masters . . . . **Midwest Communications**, Edgewood, KY has strengthened two foreign ties: a two-year extension of its agreement to be sole distributor of **A.C.E.** (a subsidiary of **Carlton Communications, PLC**) video switchers in the U.S., and an agreement to market **Toshiba**'s TV2000 Series under Midwest's subsidiary, **Townsend Corp.** Meanwhile, Midwest has restructured top management organization by assigning a group executive to each of four sectors of the company's business . . . . **Colorado Video** and **KUSA-TV**, Denver are testing Colorado Video's Vertical Blanking Interval (VBI) freeze-frame video-image transmission system. A VBI transmitter encodes still color images into a single line of the station's vertical interval; a receiver decodes the signal, reproducing an image at any location served by the broadcast signal. Potential applications include weather radar info to subscribers, graphics exchanges between broadcasters, and corporate video conferences . . . . **Otari** and **Digidesign**, Menlo Park, CA, are teaming up to develop a professional digital audio recorder/editor. The hard-disk-equipped systems will be designed as "plug-and-play" to eliminate configuration problems . . . . **AccuWeather** continues to grow, having purchased **Weather Network Inc.** along with its PC-based graphics system. This marks AccuWeather's third corporate acquisition in the past year . . . . **Microwave Radio Corp.**, Lowell, MA has purchased **M/A-COM**'s MAC Division in Chelmsford, MA . . . . **Neve** engineers from its Digital R&D department were named "ASIC Design Team of the Year" by **Texas Instruments**, which annually chooses a winner among European and U.S. candidates. Meanwhile, Neve parent **Siemens** of Austria is retooling its image via 30-second TV spots and print ads in the U.S . . . . In an effort to boost domestic customer service through direct sales and support, **New England Digital** acquired its Midwest distributor, **Songbird Digital**, Nashville, TN . . . . **R/Greenberg Associates** should be putting the finishing touches on expansion work for their New York City facility by now. Meanwhile, the production company has added Abekas, Grass Valley, Sony, Horizon, Colorgraphics and Ultimatte equipment to its digital post department . . . . As announced at NAB, **Scientific-Atlanta** signed contracts worth $3.5 million for earth-station equipment and services . . . . **NovaStar**, which specializes in audio-for-video projects and is owned by Greg Geddes, who did archival restoration work for the movie *Bird*, is now open for business in Hollywood in the technical operations center of Keystone Communications . . . . John M. Rohrbach, Jr., former GM at KYW-TV, Philadelphia and at WJZ-TV, Baltimore, is now presiding over an executive search firm in Saratoga, CA. The firm, **Carabiner Associates**, places technicians and production managers in the video and cable TV industries . . . . **Modern Teleproduction Studios**, New York City, produced and did the post work on "Barron's Roundtable 1990," a one-hour cassette . . . . A letter to Eric Wahlberg, Marketing Manager, along with $5 to cover costs, will get the video pro copies of **Videotek**'s "Applications Notes," which cover topics like system timing, SC/H phase, how to use a waveform monitor, and sync signals. Videotek is at 243 Shoemaker Rd. in Pottstown, PA, 19464-6433. ■

UPDATE

Equipment Sales

Nelson Mandela's long-silenced voice was heard by 150,000 at his February 13 homecoming rally—with a technical assist from **Electro-Voice** equipment. **Prosound,** sole South African distributor for **Electro-Voice,** erected the audio system at the Soccer City stadium in Soweto. EV HP6040 horns with MTA-42 manifolds and DH2mt, EV DH1A, and DH2012 drivers were used along with **Altec** amplifiers . . . . The 1990 Goodwill Games in Seattle this summer, hosted by Turner Broadcasting System, will use a broadcast hub being built by **Lude Broadcast Engineering**. Equipment from **Sony, Chyron, Quantel** and **Abekas** will be included at the hub . . . . Crawford Post Production of Atlanta has purchased the first **Electronic Graphics** Pastiche Paint System sold in the U.S . . . . **Rank Cintel's** ADS-2 CCD Telecine is featured at the new post house Finis in Cincinnati, OH . . . . Lorimar Studios in Hollywood has installed three **Sony** APR-24 analog multitrack recorders as part of a multimillion dollar facility upgrade . . . . **IDB International's** TAT-8 and PTAT-1 transatlantic fiberoptic services have been added to IDB's existing digital satellite link to London . . . . Toronto's The Command Post and Transfer Corporation has added a digital optics suite that includes **Quantel's** Harry . . . . **Henninger Video,** Arlington, VA, recently invested more than $1 million in digital post equipment . . . . "Channel One"—the daily newscast for teen students from Whittle Communications—broadcasts from a $2 million Manhattan facility put together by **A.F. Associates** . . . . A **Grass Valley** 300 Switcher has been added to Kappa Video's facilities in Burbank, CA, and GVG delivered the first DPM-100 Digital Picture Manipulator to AMS Productions, Dallas, TX . . . . Dirt and dust problems at WFLA-TV's (Tampa, FL) new tower were solved when the station installed a **CosaTron** air-cleaning system from **CRS Industries** of Tampa, FL . . . . Uplink Ltd. has taken delivery of a **Marconi Communications Systems** Transat transportable satellite earth station . . . . New York's Broadway Video uses a **Dubner** 6k unit to code character generation for Multimedia Entertainment's "Sally Jessy Raphael" program promos . . . . Howard M. Schwartz Recording, New York, has added a **Sony** DVR-10 D-2 recorder, which will be used to reformat in D-2 and re-lay all the audio tracks for vintage "Saturday Night Live" episodes . . . . Sutcliffe Music, New York City, recently installed a pair of **Timeline's** Lynx SAL time-code modules; Timeline Lynx keyboard control units and Lynx time-code modules have been sold to Maryland Public Television, The United Way and Musifex. ■



Grass Valley's DPM-100 Digital Picture Manipulator was sold to AMS Productions in Dallas.

Murray is well-known in the broadcast-transmission end of the business as president of Loral TerraCom, a San Diego-based transmission company, and of Farinon Video, a manufacturer of transmission equipment.

One of Murray's first projects will be the marketing of the DV series digital microwave radios. Available in both 18- and 23-GHz frequency bands, the DVs are geared for the transmission of digitized video and audio, integrating codec technology with high-performance digital microwave radio.

"Instead of having a separate [plug-in codec], we built the codec right into the microwave," notes Bing, who says that broadcast applications will include use as a link between studio and transmitter, and

in electronic news gathering, intercity relay, and earth-station backhaul feeds.

Will DMC Digital and its products succeed? If Digital Microwave's fast growth is any indication (in the company's first four years, it shipped 9,000 digital microwave radios and 4,500 fiberoptics terminals, and 1990 revenue estimates are $111 million), the answer is probably "Yes." Yet the company has made missteps in the past. In April, the *Wall Street Journal* reported that Digital Microwave stock plunged almost 50 percent when the firm announced that fiscal fourth-quarter earnings fell below estimates because of "company errors in manufacturing and selling" a new microwave radio used by communications companies. William E. Gibson, the president and CEO of Digital, told the *Journal* that losses resulted when the firm moved from pilot manufacturing to mass manufacturing of the radios, which were also underpriced. In spite of all that, one real heavyweight firm seems confident about hooking up with the fledgling DMC: AT&T Network Systems has committed to a field trial of the DV radio series. —*Tom Soter*

Dropping In On Merrill Lynch

Readers have inquired about the identity of the teleproduction facility whose photo is wrapped around the "drop-in box" on April's cover, illustrating the story on CAV. It's Control Room A at the new Merrill Lynch studios at the World Financial Center in New York City. Photo copyright is 1988 by Washnik. ■

Television Engineering *welcomes your comments and opinions. Write to us c/o Editor,* Television Engineering *magazine, 401 Park Avenue South, New York, NY 10016. You may also fax us at 212-696-4215.*

Sikes Speaks Out On HDTV

By Peter Caranicas

Two Federal Communications Commission decisions this past March put the future of advanced television in the U.S. into sharper focus.

First, the FCC said that the HDTV transmission standard it chooses to support in 1993 will be a simulcast, not an augmentation, standard. This means that stations will be allocated separate HDTV channels and will simultaneously broadcast HDTV and NTSC programming, rather than being allocated a channel to send a signal that would "augment" their NTSC signal into an HDTV signal for specially equipped sets.

Second, the FCC said it would not rule on an EDTV (enhanced-definition television) standard before ruling on an HDTV standard in the spring of 1993—a decision that many say could postpone EDTV development, if not stop it totally, should HDTV become a quick success.

In fact, our June "ATV Watch" looked at both decisions in relation to NBC/Sarnoff's Advanced Compatible Television (ACTV), an EDTV candidate. In that column, we also revealed that Philips Labs expects to have a simulcast HDTV system ready by 1991.

This time, we take a more global look at these crucial advanced-TV decisions through an interview with FCC Chairman Alfred C. Sikes. When *Television Engineering* recently caught up with Sikes, we asked him to explain the thinking behind these decisions, as well as to comment on some of the more controversial issues surrounding the advent of HDTV.

***Television Engineering*:** The FCC agreed not to rule on standards for EDTV before ruling on an HDTV standard. Do you think this will arrest the development of enhanced-definition systems?

Sikes: I hope not, although it could have some negative implications. We were not pressured enough to conclude that we wouldn't choose an EDTV standard. We did, however, rule out the two-step process. We indicated that we thought EDTV, in terms of both its physical and its economic characteristics, needs to be examined as this overall measuring and testing process evolves.

***TE*:** In the simulcast-versus-augmentation area, you went for simulcast. Was there an overriding reason for that decision?

Sikes: Spectrum efficiency was the guiding reason.

***TE*:** So it had nothing to do with the actual signal quality or the technology involved?

Sikes: It didn't. Although I was told by expert after expert that the developments in the area of simulcast were very encouraging—in fact, so encouraging that there had been some slowing of the work in augmentation.

This is a process that's hard to get your hands—or your arms—around. As you narrow things down, you direct the process more specifically, and you expedite it. That's in part what we did.

***TE*:** In making these decisions, does the FCC take into account the impact they have on American companies versus overseas companies?

Sikes: Let me get into some background on this issue. I came [to the FCC] from the NTIA [National Telecommunications and Information Administration] in the Department of Commerce. I worked on HDTV for almost three years within that context. It's not possible for me to completely exclude that sort of information from my mind. Ultimately, however, what we must do is make a decision that serves both the broadcast industry

FCC Chairman Alfred C. Sikes

and the consumers well.

Now, you didn't ask it this way, but I'll tell you what I mean. Let's say, for example, that Zenith had said: "Guys, this [timetable] is six months too short; can the FCC make the decision in the fall rather than the spring of '93?" I might well have cast one vote in favor of that.

I have said that the system proponents should come to the FCC and present—beyond just their system—information on their intentions for research and development in evolving high-definition television in the United States. Because I am convinced that research and development here is going to have an effect on the evolution of HDTV here. If it's done exclusively in Asia or exclusively in Europe, it will be done in a different broadcast culture. It might be done skewed for satellite, as some of the early HDTV research was. So I do think it's important that the research and development activity continue here.

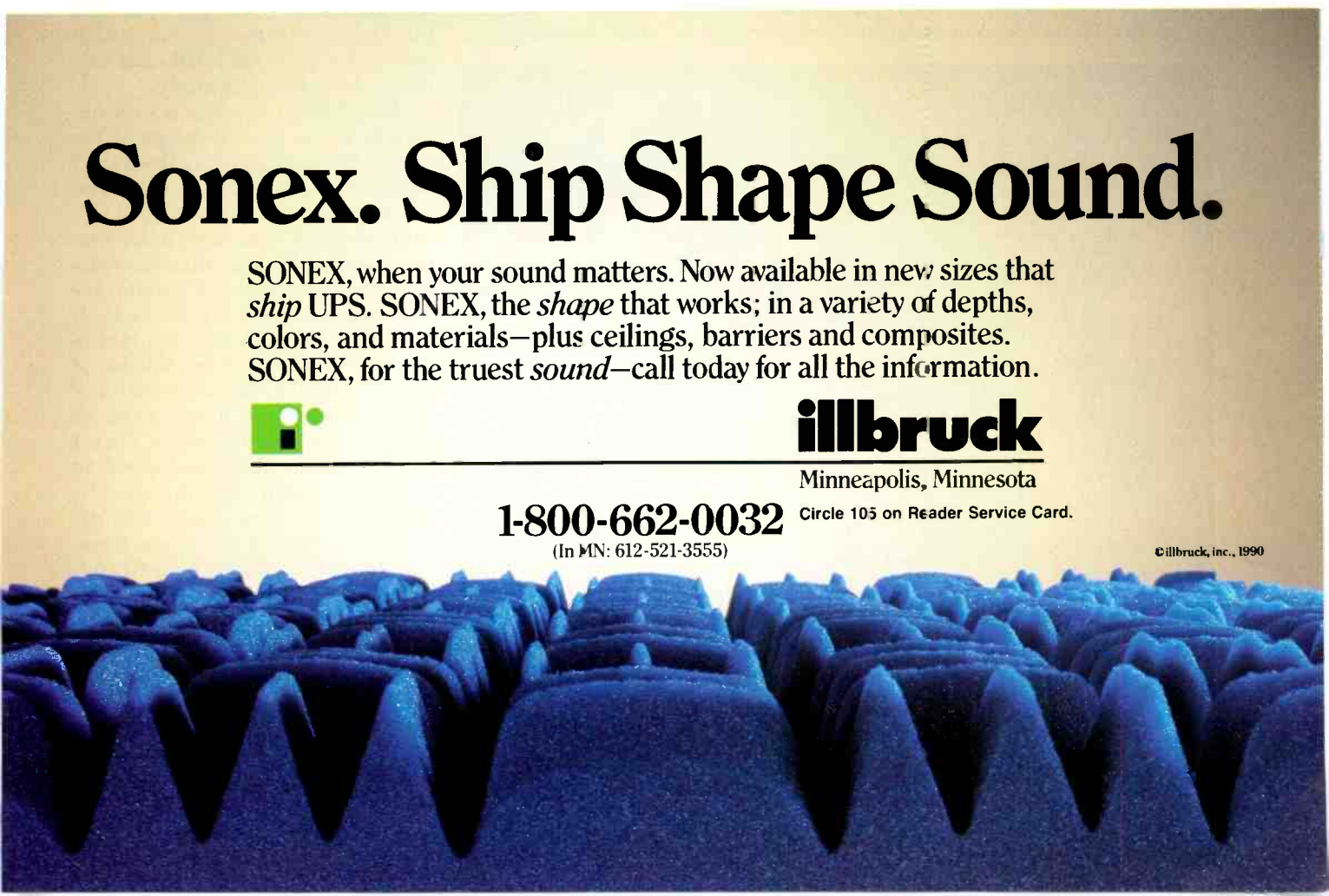
"We ruled out the two-step EDTV-HDTV process . . . [but] EDTV needs to be examined as this overall measuring and testing process evolves."

TE: Would it be fair to say that while the interests of U.S. companies are always on your mind, they are not the primary factor in making these decisions?

Sikes: That's an accurate expression. I must add that each participant in this process—whether it be a U.S., Japanese or European participant—should be assured of fairness. Ultimately, we are going to be judging a series of objective measurements, and making up our mind on the basis of those measurements.

TE: Are you at all dismayed by foreign encroachments into U.S. broadcast-related businesses?

Sikes: I'm really not. I *am* dismayed at the fact that we have as sizable a trade deficit as we have and that we have had it for so long, and that we tend to be more consumption-oriented and less savings-oriented as a society. I think the foreign competition we face might help us come to grips with some of the problems we are otherwise unable to cope with. I think some of this is a wake-up call for our country. The worst thing we could do would be to provide a protective bubble, because we would quickly become less competitive across the board globally. ■



CPN-TV Puts Florida On the Digital Map

By Dan Daley

A lot of things have changed in the audio-for-video realm in recent years, and while the spotlight has focused on technology, other things have been shifting as well. Traditionally, U.S. power centers have been Los Angeles and New York, homes to the film, television, and commercial advertising industries. But escalating costs, union contracts and other factors in these twin hubs have brought new locations to prominence.

One area in particular has shown tremendous growth: central Florida. With Disney installations as pathfinders, other film companies have followed, including MGM and Paramount. All this activity has made the region ripe for independent audio-for-video facilities to spring up. One such facility is Cable Productions Network-TV (CPN-TV) in Clearwater. CPN-TV is a multi-room production facility whose high-tech doors opened last February onto two large shooting stages, two on-line video editing suites, one off-line suite, and what might be the most advanced audio-for-video suite in the state.

Designed by CPN-TV's director of audio, Bill Cavanaugh, a 20-year veteran of audio, and audio for video, the audio suite is based on what he calls "the mother-ship model," in which full digital implementation is designed to interface with an increasingly multi-formatted world, and with an economic environment in which outside clients can't be relied upon as a profit base. The totally digital format of the room—a Tapeless Studio installation by New England Digital employing a Synclavier 9600 with 48 voices and 48 Mbs of RAM, and a 16-track PostPro system, as well as Sony D-2 tape machines—puts the equipment list on the cutting edge.

While CPN-TV generates most of its own productions—commercials, film documentaries and so on—it does rent out time to other audio (and video) users, and sometimes exceeds the nearly dozen staff writer/producers it has for in-house productions. Outside composers can interface their technology through the MIDInet option on the Tapeless Studio system, which can control up to 128 MIDI-controllable functions simultaneously.

"The MIDInet function is very important to the overall design of the room," Cavanaugh says, "because I designed the system to be able to do virtually live mixes to video. All video information is brought in here on D-2 cassettes. We then take the audio information from the D-2's digital audio tracks and load it into the PostPro's disk. From there, I can modify the audio information in a number of ways; I can also add additional dialogue, sound effects, library music or a completely original score. Then I can mix all the audio tracks back to the D-2 cassette live, and the MIDInet lets me have tremendous dynamic control over the effects I use. For instance, I can have a slightly different reverb on every snare hit. The bottom line result is that everything gets mixed live and stays first-generation digital."

CPN-TV's audio director Bill Cavanaugh shows off his audio suite.

CPN-TV chose the D-2 digital videotape format as much for its mechanics as for its digital qualities. Cavanaugh says: "The D-2 cassette has an incredibly fast wind time; you can wind through a minute of video in about a second and a half. That's important when you're already working with a random-access disk recording system like the PostPro. I expect that at some point in the future there'll be a random-access format for recording video. The interesting and ironic thing is that after audio [technology] has lagged behind video for so long, the situation now is that audio has to wait for video to catch up. Once that happens, the recording studio will begin to approach the way the human mind works in that there won't be any time lapses between inspiration and execution. The technology will approach the speed of a person's imagination."

Cavanaugh, who is a composer/producer himself for CPN-TV (and was also the bassist for the Outsiders of "Time Won't Let Me" fame in the '60s in his native Cleveland) has tried to incorporate as much control over sound parameters as the present technology will allow into the audio-for-video suite at CPN-TV. The room's 48-channel Neve VR console has the Flying Fader option, as well as full recall of module statuses as part of the Neve automation system. The NED PostPro and Synclavier process MIDI information at two Mbs internally. The suite's copious outboard, including a Lexicon 480L digital effects processor, can be controlled via dynamic MIDI. The D-2 machine is a Sony DVR 10.

The completely digital audio-for-video studio is beginning to manifest itself as a unique animal. While certain basic conventions, such as consoles, processing and storage systems will remain in some shape or form, the synergism among them and between equipment and user is changing. "The line between the recordist and the mixer is blurring in video and film," Cavanaugh cites as a current example. "We can 'nest' a lot of those functions together in a single stage with the Synclavier and the PostPro. Literally, we can do mixes as we record the program material."

Another way that this room reflects the changing nature of the digital studio is in its ergonomic aspects. Cavanaugh says he paid particular and equal attention to both the near-field and far-field monitoring situation. Close-in monitoring is done off Westlake BBSM speakers, while the far-field is handled by Meyer 833/844 speakers. "The room is set up so that either one person can run everything while also working as composer/musician/producer, or two or three people can comfortably work in here covering those roles," explains Cavanaugh. "People are writing differently these days. They interface with the equipment differently, such as through MIDI, and they're becoming composers and engineers simultaneously."

"The future for recording is definitely digital, but technology is changing the playing field considerably." —Bill Cavanaugh, director of audio, CPN-TV

Two things that seem to characterize this new breed of composers and scorers is that they tend to work alone as often as not, and their engineering chops are being acquired on the fly on home recording equipment. Cavanaugh kept this in mind during the design stage of the audio-for-video suite at CPN-TV. "Methods of composing and arranging are so tied into MIDI technology now," he says. "The sonic image is now part of the compositional element. It used to be that you would ask the engineer for reverb; now you have more reverbs at your fingertips and more control over more parameters of each reverb than ever before. The people who come to work in this facility are very literate in this area, so in designing the room, I aimed for, and, I think, achieved building an extremely high-end one-man digital workstation."

The one million dollars CPN-TV owner and former magazine publisher Stuart Arnold poured into the audio-for-video suite at the facility is an early reflection (pun intended) of the future of audio-for-video post-production. It's been driven by what Cavanaugh says is an increased consumer awareness of audio quality. "It used to be that people would say, 'If we have any money left after putting up the drapes, we'll put it into audio.' That can't happen anymore; the man in the street hears things differently now. With the advent of compact discs, stereo television and things like that, audio is becoming as critical to television as it had been to films. [Even] in terms of content, as we have to start mixing for video the same way we mix for larger venues like theaters. The small screen isn't so small anymore."

The future for suites like this one—and for recording studios in general—depends on consumer and professional acceptance. In making decisions, Cavanaugh felt a need to be as forward-thinking as possible, while at the same time choosing proven technology. He feels he has done that with the NED Tapeless Studio, the Neve VR console and the D-2 capability.

But it's more than just a hardware equation. "The future for recording is definitely digital," he states, "but technology is changing the playing field considerably." The use of personal audio equipment forces studios to ramp up their capabilities to make them distinctly different, Cavanaugh says. Renting out their facilities probably won't cover the studio's cost of high-ticket equipment. "The result for the studio business will be less rental time and more of a need to generate and control actual product." ■

Dan Daley is a New York City-based freelance writer specializing in audio technology.

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DIGITAL CONNECTIONS

By Claudia Kienzle

As long as digital and analog co-exist, managing the equipment interface will be a major concern among TV engineers.

"I haven't slept since I came back from the NAB," says Joe Tuckosh, president and owner of AV3 in New Castle, DE. "I went down there with plans to design an all-component digital suite to offer my clients the ideal environment for editing. But I didn't see a quality component digital field recorder being introduced. The reality is that D-2 and Beta SP are still the best choices for field acquisition, and that most existing source material is still found on analog composite formats, so now my engineers are thinking about ways to integrate these different formats into one suite."

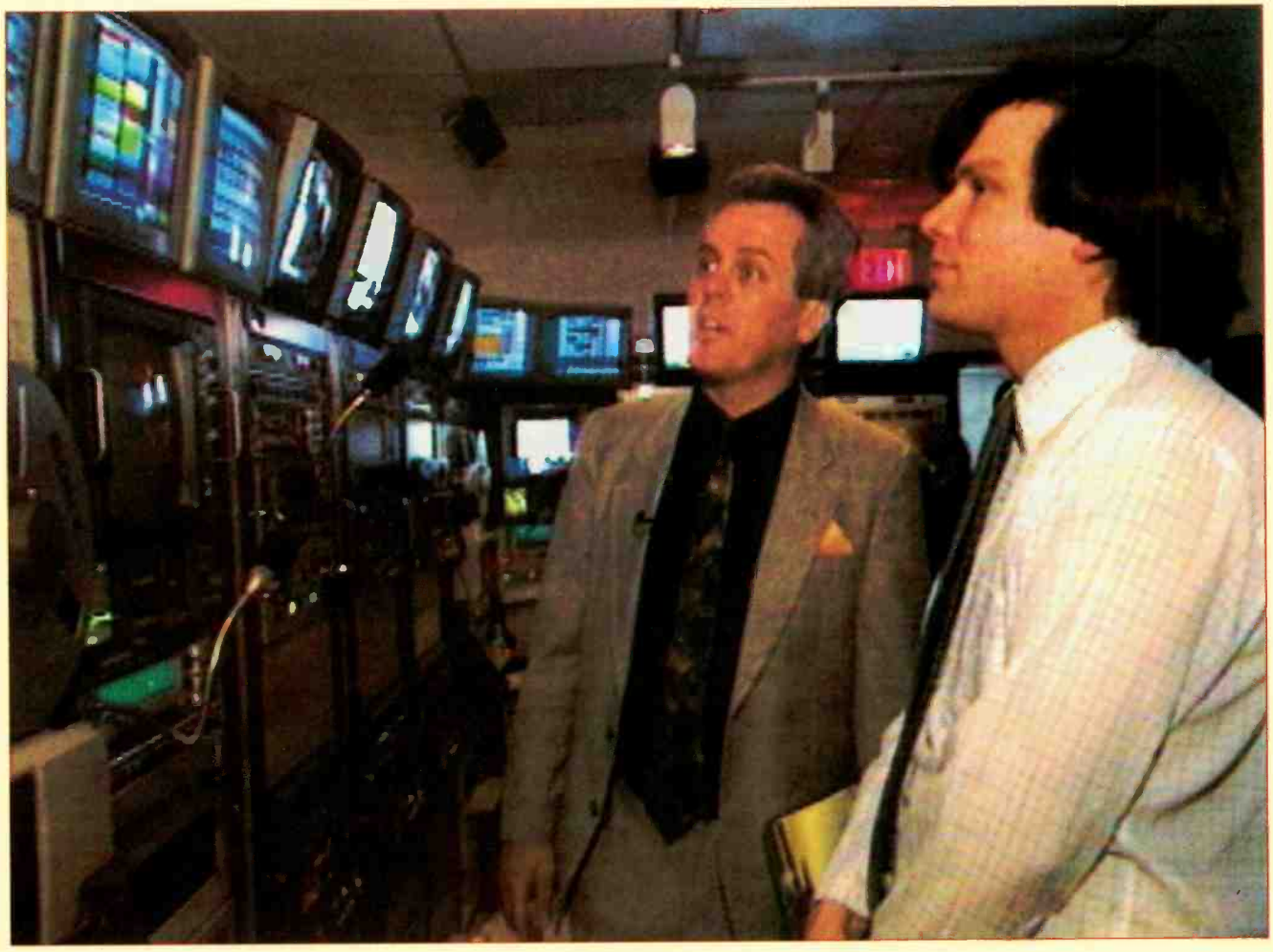
AV3, a post-production house between Philadelphia and the Washington/Baltimore area, was designed two years ago. At that time, the transition from composite to component was just beginning. Although many professionals speculated that the digital formats, which offered superior picture quality and better post-production capabilities, would quickly replace the pervasive one-inch format, it hasn't yet happened.

"It was never our intention for D-2, for example, to replace one-inch, but rather to provide greater multi-generational capabilities, as well as be a stepping stone for many users to get into digital," says Rob Corrigan, marketing manager for studio recorders at Ampex. "The hybrid environment of today's different formats means that you can now choose the equipment best suited to your particular task."

As older VTRs show wear, they are gradually being replaced with new digital VTRs. Stevan Vigneaux, Sony's manager for product development, says, "We've seen an increase in sales of D-2 VTR machines, and this is the first year in which Sony has shipped more D-2 tape than one-inch tape. However, there are still a lot of one-inch and ¾-inch machines in use today, and the older equipment is still being supported and marketed by this company."

ERA OF THE HYBRID

So, for the foreseeable future, the signs all point to a hybrid environment, where analog and digital formats must happily coexist. Vance Piccin, freelance video editor and Quantel Harry operator in New York City, comments, "Facility managers are all walking a tightrope, trying to balance the gear they already have with their next equipment purchase. They're hedging their bets against obsolescence. Interface equipment helps them bridge the gap between analog and digital gracefully, so they don't have to start all over."



The Post Group's Director of Engineering, Andy Delle, right, with Jay Curtis of BPME, touring The Post Group's Digital Center.

And according to Craig McCartney, marketing manager for special effects and graphics at Ampex, "Care has to be taken in constructing the backbone system of the facility with equipment that ties all the different formats together. The parameters of the routing switcher, the length of the cable, and the use of black box translators are some of the important considerations when designing a hybrid production environment, or the wonderful digital signal in your ADO won't ever make it to the D-2 machine it's being recorded on."

Interfacing analog composite, digital composite, analog component and digital component formats—and all the permutations—can get rather complex for any broadcast or teleproduction plant. At a large post-production facility or high-end graphics house, the complexities multiply.

These larger operations are more likely to produce sophisticated, multi-layered, multi-generational graphics or animated projects for their clients.

POOL OF FORMATS

At The Post Group Digital Center in Los Angeles, a "pool" of D-1, D-2, one-inch, ¾-inch and Betacam machines is available to four telecine suites, four digital graphics suites, and three edit bays. Andy Delle, director of engineering, custom-designed a touch-screen computer-controlled routing system to "patch" the signals automatically, as quickly and efficiently as possible, thus avoiding costly delays for the facility's clientele.

"I chose to use a standard bus industrial-format computer because of its reliability," Delle says. "Obviously, if a routing switcher goes down, it can be disastrous, especially when you've eliminated a lot of your patching. The software is all written from the ground up, in both 'C' and Assembly Language, so we know every aspect of it. We don't have to worry about hidden bugs like we would using off-the-shelf software."

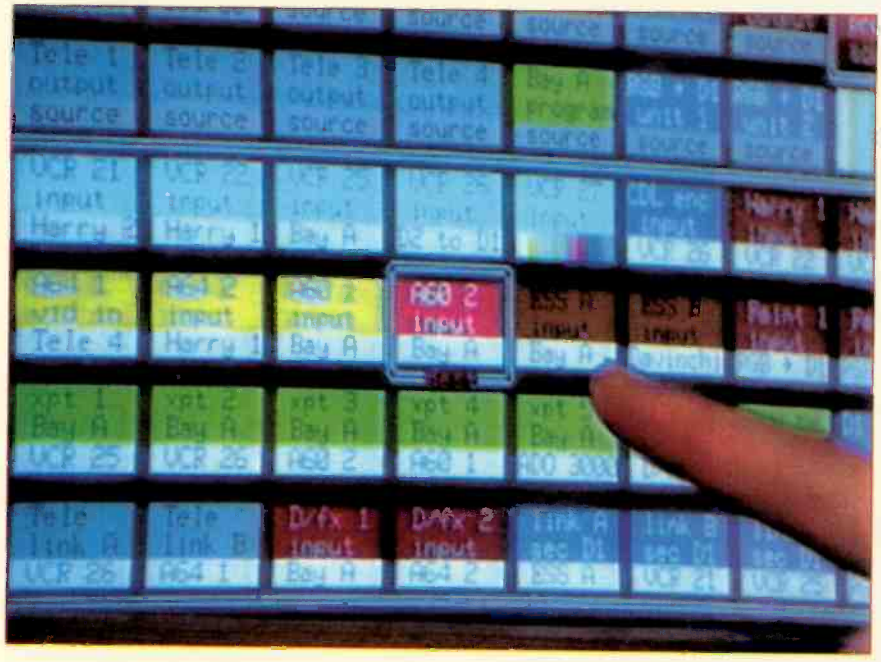
The system employs six EGA computer monitors, modified with Tektronix touch-screens. The user-friendly touch-screen monitors display boxes measuring one by ¾ inches, arranged menu-style, listing all the sources and destinations. The six screens are conveniently located above the VTRs, offering everyone

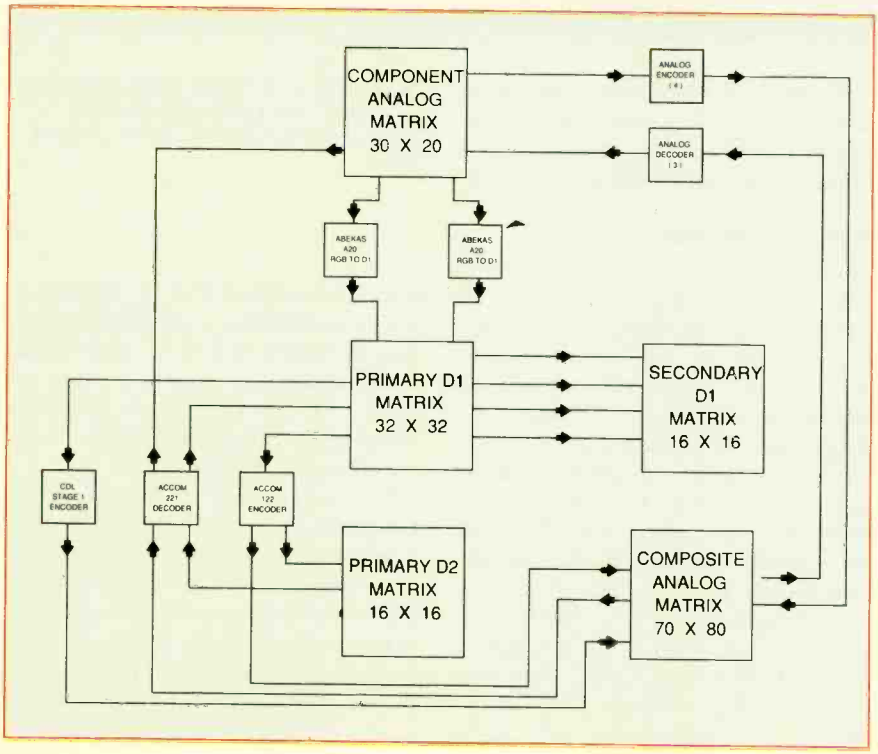
easy access to them.

"You touch a source box, then a destination box, and 'take,' " Delle explains. "If you selected the wrong thing, you simply start over. There's also a color-coded status screen that shows all the activity in the routing system at any given time."

The computer system controls the following: a Utah Scientific DVS-1 digital switcher arranged in three sections (one 32 x 32 for D-1, one 16 x 16 for D-1, and one 16 x 16 for D-2); a Utah AVS-1 component analog 30 x 20 routing switcher (SMPTE format); a Utah AVS-1 composite NTSC 70 x 80 routing switcher; two Abekas A20 converters (RGB component analog to D-1); an Accom 122 digital encoder (D-1 to D-2); and an Accom 221 decoder (D-2 to D-1).

All the VTRs, telecines, production switchers, and graphics suites are also on-line. Four Faroujda encoders and three decoders (RGB to NTSC) are all routable. "One advantage to this is if we think we have a problem with one of them, we can instantly switch another in its place, eliminating a lot of down time," Delle says. "With our touch-screen system, you can see you're selecting an RGB source, to a D-1 translator destination, taking it into the D-1 edit bay, and the signal shows up there immediately, with no patching and with minimal effort. It's proven very reliable."





BRIDGING BARRIERS

To help bridge the format barriers between component digital and composite analog formats, Accom stepped in to market a line of encoders and decoders, generically called transcoders. AME, Inc., the large Burbank, CA facility, is purchasing 24 Accom D-Bridge 122 encoders, which go from component digital to NTSC and PAL, in order to improve the quality control of film transfers.

"The telecine outputs in D-1. However, a great percentage of the work will end up on one-inch for broadcast or VHS distribution," said Bill Messersmith, AME's VP of engineering. "We're attaching the Accom 122 encoders to the output of every Rank telecine and D-1 machine we have, so that when the colorist does scene-by-scene color correction of the film, he'll be able to see on the monitors exactly what the colors will look like digitally encoded."

The Accom 122's internal processing is digital until the final analog output. Accom VP of marketing and sales Ed Engberg says: "We saw a strong need for developing a quality transcoding device that would work well enough so that you wouldn't be able to tell if the source was archival composite or D-1."

Top, closeup of touchscreen controller; bottom, schematic diagram of computer-controlled routing switcher at The Post Group.

ROLE OF MONITORS

For those who want to go between the RGB "out" on a telecine and a D-1 tape machine, the BTS CD-7 transcoder is useful. It goes from component analog to component digital. Conversely, the BTS DC-7—component digital to component analog—transcoder is useful for going from D-1 into an RGB monitor or component analog format.

Doug Buterbaugh, marketing program manager for BTS, says: "Most monitors can take the NTSC output of a D-2 tape machine. However, you always have to do a transcode at the monitor location if you're using a D-1 source, since most monitors have no built-in transcoding capability for D-1. Newer monitors, which feature built-in transcoders for D-1, are just now becoming available."

At Planet Blue, a high-end graphics house in Los Angeles, chief engineer Mike Goslin and senior engineer Bill Laverty created a custom-designed D-1 patch bay for routing component digital. "When we were planning this facility two years ago, D-1 was not that well established," Goslin explains. "We found digital routing equipment to be very expensive, and serial routers not immediately available for delivery. We knew we would have to devise a digital patch bay for ourselves that would be easy to install, simple to operate, and available right now."

The D-1 patch bay uses slide-latch connections instead of the screw-down type, allowing the user to connect the patch cords and just snap down the latch. "Slide-latches are not really great for making permanent connections, because after a few days, they begin to vibrate apart," Goslin says. "But because we needed quick-type connections that could be changed easily and often, slide-latches work great for our purposes. We took the ends of the digital cables, terminated them on a metal panel, and put the slide-latches on the outsides, along with male-ended cable connectors with 25-pin posts. When we put in the corresponding female connector of the other patch cord, the slide-latch naturally flips onto your thumb, and you push it down into place. It's been very reliable, and we'll probably add another panel shortly."

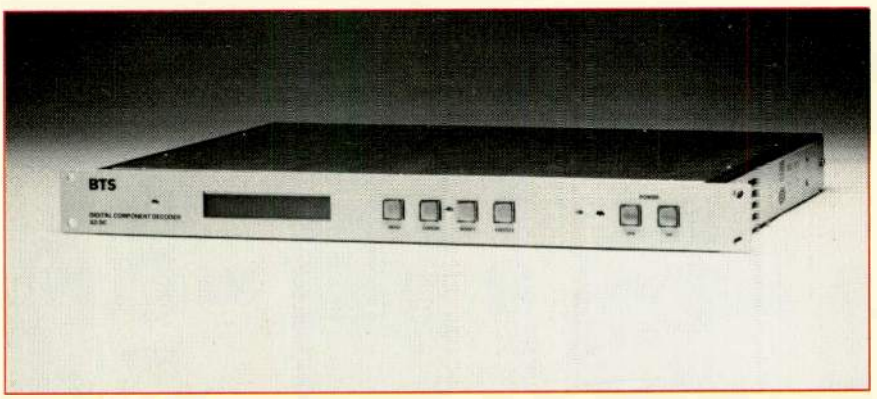
PARALLEL AND SERIAL

If Planet Blue had chosen to buy a digital router two years ago, instead of designing this D-1 patch bay, the facility would have invested in a parallel format router. "Serial routing is the next evolutionary step in transmitting the D-1 signal, and we intend to switch to it," says Goslin. "Serial would obsolete any parallel router we bought a year or two ago."

Parallel-format routing requires high-quality, expensive digital cable, with 12 pairs of wires inside. "Each pair carries data and a clock that tells you whether there's a high or low pulse rate," explains Goslin. "When you pull digital cable up around 150 feet, you risk altering the length of the conductors inside, and the data can get skewed relative to the timing. If one of the higher-priority bits is affected, you don't just get a little break-up, you lose the complete intelligibility of the picture. With digital, it's all or nothing."

Digital cable is time-consuming to assemble. By comparison, Mark Adler, chief engineer at Editel, Chicago, notes: "Serial connectors can be assembled in 45 seconds, using the same coax cable, crimping tools and assembly technique that engineers have employed forever, saving on labor costs. And since the bits travel one after the other, they don't arrive in the wrong configuration, screwing up the picture. Serial is absolutely more reliable than parallel."

Not all equipment manufacturers have serial format I/O ports for their products yet, which presents challenges to the older facilities. "Most of our sources do not have serial outputs on them," Adler says. "So, we're opting to run with a hybrid system, where our parallel and serial routers are going to be linked with P-to-S and S-to-P convertors. We're living in a



Top, BTS DC-7 Digital Component Decoder; bottom, Accom 122 D-Bridge 221 Digital Decoding System, making the Digital to Analog connection.

state of conversion, phasing out parallel equipment and driving toward serial."

The two original D-1 machines purchased by Editel have parallel outputs, and can feed only the Grass Valley DHX parallel router. The two new D-1 machines have both outputs, so they can feed the old Grass Valley parallel router or the new Alpha Image serial router. The Alpha serial router currently takes inputs for the Kadenza, "but since the Kadenza's ports are still parallel, we need a P-to-S converter there," says Adler.

At Tape House, in New York City, the decision is to stay with parallel routing. "Changing over now would mean scrapping our digital routing switcher, which is a costly item, and it would mean modifying the I/O ports on every piece of D-1 equipment to accept serial," says chief engineer Dave Corbitt. "So, you're talking several hundreds of thousands of dollars to change everything over. If we were starting from scratch, then it would be smart to go with serial because of the economy of design, but we've already invested in the parallel stuff, and it's extremely reliable."

EVERYTHING YOU CAN IMAGINE

Tape House uses a Utah Scientific DVS-1 to interconnect D-1, D-2, Beta SP, one-inch, the Ranks, the Accom 221, Kaleidoscope and Harry. "Everything you can imagine is on our router. We have factory-supplied panels that can connect any crosspoint to any destination," Corbitt says. "Routing the signals around is not the problem in interformat connection. That just takes a couple of minutes. Setting the playback levels correctly and making sure everything is in phase is much more involved."

Complex routing systems and interconnecting devices are unnecessary if the number of source and destination points is minimal, or if editing and playback between formats is kept simple. Plus, many major equipment manufacturers are routinely including analog I/O ports on all the new digital VTRs, allowing easy equipment interface.

Sony's Vigneaux considers this the most critical point today in equipment interface. "All the digital VTRs we manufacture have analog inputs and outputs on them," he says. "This makes it very easy for the customer to integrate digital machines into their analog system."

In mid-April, when Viacom began converting its Smithtown, Long Island playback and uplink facility—which transmits Nickolodeon, MTV and VH-1—to all-D-2, it was a simple matter of "just plugging in D-2 machines where one-inch machines used to be," explains Scott Davis, senior VP of network operations for Viacom. "Though we don't have a particular need to go D-1, we did have a desire to go digital."

At WTBS in Atlanta, GA, chief en-

Maxell has the classics.

Photo: Bill Milne

gineer Jack Verner says, "The only way we really use the digital capability of our machines is to make dubs from one D-2 VTR to another, and that's done by direct cable hook-up between the two machines."

FREE INTERMIX

Grass Valley Group also realizes the importance of easy-access analog I/O ports. "People can get by just fine using the ports on the back of the D-2 machine," says GVG product marketing manager Ken James. "Also, our Kadenza has internal transcoders that accept and output material from NTSC, Betacam SP, D-1 and D-2 formats."

A spokesperson for Limelite Studios in Miami notes: "We program the input and output buses on the Kadenza just by selecting pre-set buttons. The Kadenza acts as a router, letting us freely intermix between formats with no problem."

Another trick for avoiding the messy transcoding problem is to keep the digital component signal segregated from the digital composite systems. In the graphics suite at WTBS, "The D-1 machine is used solely for graphics and it never talks to the D-2 machines, used for broadcast," according to Verner. "Graphics done on D-1 leave the suite either on an 80-megabyte disk, interchangeable with our other graphics stations, or they're transferred to the still-store system, which can be accessed from any of our control rooms," he adds.

However, you could just stay composite analog until all the dust settles and the road to digital is more clear. At Center City Video in Philadelphia, chief engineer Christopher Bishop explains, "In our market, we're not getting a push from our clientele to go to the digital formats. For us to be able to take care of the debt of acquiring this equipment, we first have to demonstrate to the banks that there is sufficient demand, or that the competition is moving in that direction."

"Each marketplace and each individual business is going to be different, and some will be driven faster toward digital than others," says Sony's Vigneaux. "It's hard to say how far off the day is when everything will be digital, but it's coming. You'll have to make a business decision as to whether it's a reasonable move for you to make, and how you're going to integrate the composite and component worlds at your particular facility."

But at AV3 in New Castle, the difficult decisions about interfacing formats have yet to be made. According to Tuckosh, "If color television had come first, everything would have been component from the start. But since they had to squeeze the color signal into the same bandwidth as the black-and-white signal, it led us to the whole dilemma we're in.

"Component is the way it should have been right from the beginning," he says. ■

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FREEZING IMAGES WITH HOT TECHNOLOGY

By John F. King

New technology is greatly extending the power and versatility of still-store systems.

The still store, which came about more in response to a market need than as a demonstration of the wonders of new technology, may not be the most glitzy video device. But it sure is useful—especially in TV news operations. Just ask any production manager who's ever had to videotape stills for the boxes hovering over newscasters' shoulders. And recent advances in digital technology have made still stores much more sophisticated, and extended their applications into new areas of post-production.

Several makers offer standalone still stores. A few manufacturers incorporate them into a multifaceted device, such as a workstation, digital video effects device unit or character generator. Yet even standalones are adding more effects capabilities, thus blurring the line between still store and DVE.

Also, multiple-user needs are getting more attention through the use of dual channels, the ability to add keyboards, and connection to other devices. And networking potential is becoming important, with Leitch Video actively promoting a distributed network called Still File for its DSF-3100s, while Sony is readying for market a DNS-1000 that can be networked.

SINGLE USER, MANY USES

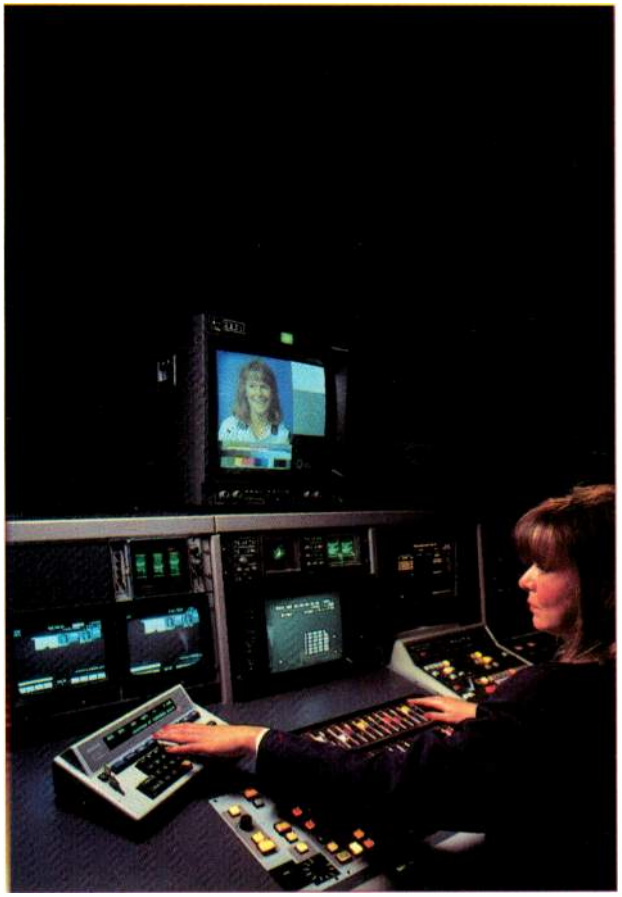
A post-NAB canvass of still-store manufacturers turned up nine makers of standalone units, and three other makers who integrate a still store into a larger device. Interviews with still-store users revealed a range of applications at stations and post-production houses. The users interviewed ranged from small stations like KVVU-TV, a Fox affiliate in Henderson, NV, to large post-production houses like The Post Group, which is a 45-room facility located in Hollywood, CA.

In fact, KVVU-TV and The Post Group have something in common. Both of them use Ampex still stores. The station uses an ESS-5G both for on-air and post-production. The facility, in turn, uses five ESS-5s still stores in a network.

The ESS-5, which processes images in 4:2:2, is designed for single users. (For multiple-user needs, Ampex offers an ESS-3 model, which handles one to 10 users.) With list prices starting at $24,000, an ESS-5 system can accommodate more than one keyboard. Also, the optional dual-channel feature allows one channel for on-air use and a second for "browsing" or previewing. The ESS-5 has a built-in Winchester drive that can store 200 NTSC images (160 in PAL format).

The ESS-5G model adds graphics composition capabilities to still storage. A Compose mode offers color selection, cut-and-paste, and luma- and chromakeying, among other features.

At The Post Group, a dual-channel ESS-5 serves as central storage for



A colorist at The Post Group in Hollywood uses the Ampex ESS-5T to enhance color correction in film-to-tape transfers.

the network, which grew out of three ESS-5s being used in a telecine suite for the past 2½ years.

Rich Thorne, chief operating officer for The Post Group, says the still-storage network serves as "an editing source like one-inch tape or a camera. It's a lot easier to deal with ESS than to roll tape trying to get a still."

While Thorne has arranged a central net of ESS-5s, Leitch DSF-3100 users can choose an Ethernet-distributed network called Still Net (with a minimum of three control units necessary for the option). The advantage of a distributed network over a centralized one is that each user in a distributed net has independent access and control (see Figures 1 and 2). On the other hand, sometimes a facility will want just one centralized place for the database of stills.

SIMPLIFYING THE SEARCH

Even without the Still Net option, Rex Colby, production manager at KOLO-TV in Reno, NV, describes his Leitch DSF-3100N as "an incredible product." Like The Post Group, KOLO would videotape still sequences before they purchased a still-store unit.

Colby's station uses one unit with dual channels, mostly for newscast graphics. The second user can store graphics, but does not have database access. Each individual store can be identified by six key words, and hunting for stills is like looking for information in a personal computer database. That means that one key word may be enough to find an image. In addition, the Leitch, like the Ampex, boasts a 0.6-second access time for a single user.

KOLO uses an ADO-1000 for effects because they do not have the compress option for the Leitch. "We store the news graphics still as a full-screen graphic, and use ADO to squeeze it down, then the second channel of the still store to save it," Colby explains.

With 700 Mb available, storage space is not an issue for Colby. (Leitch says the DSF-3100N has a basic capacity of 1,500 stills, and up to 10,000 with optional disk drives.) Colby does, however, have reservations about off-line storage, which is "an extremely slow process." Leitch plans to add a Sony product for removable storage to replace the current stream tape, Colby reveals.

He states a key argument for having a standalone store rather than one as part of an integrated system: "I would have trouble justifying an integrated system," he says, "because if one piece goes down, you lose the whole system."

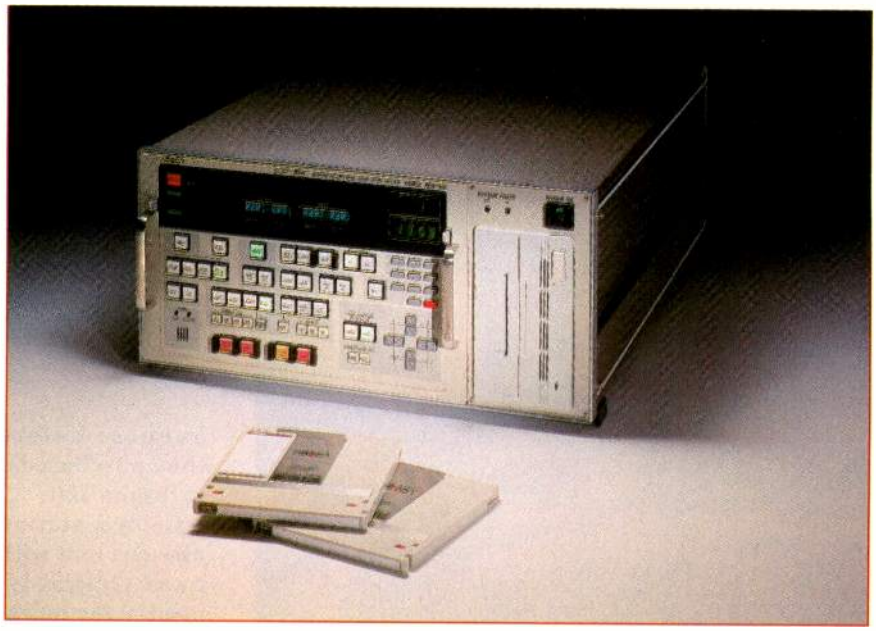
STEADY STILL

One steady, long-time participant in the still-store standalone market has been the Abekas A42. While software updates and options have been added, the A42 is the same basic model that came out in 1983.

The dual-channel A42 processes images digitally (in 4:2:2) and offers an optional digital interface for D-2 output. A virtual picture-numbering system lets the user number pictures from zero to 9,999 without having to track the picture location on disk. The A42's built-in 5¼-inch Winchester is complemented by a streaming tape drive for off-line storage. Abekas's dual-channel system lets one channel display pictures while the other can be used to record, play back or create sequences. Dissolves and cuts can be programmed for on-air transitions between the two channels, and a graphics compose mode adds layering capability.

Compact size and a price range of $20,000 to $40,000 make the A42 popular for sports mobile units. ABC network in New York City; NBC in Los Angeles; KBHK-TV in San Francisco; Nashville Network; KHJ-TV in Los Angeles; KAAL-TV in Austin, MN; and Home Sports Entertainment in Houston, TX are some of Abekas's most enthusiastic customers.

ABC uses four or five A42s in the field every week for sports, according to Dave Linnick, ABC's manager of outside broadcasting. Linnick praises the compactness and reliability of the A42 and says it has "sufficient storage for what we do in the field." The streaming tape proves very useful for transferring still sequences back to the studio.



Switching from Arvin Echo analog systems five years ago made a tremendous difference; Linnick says there is really "no comparison" between the digital Abekas and the analog Arvin. He adds that at the time it was purchased, the Abekas was "a head above" other units on the market. The then-new technology did not present stumbling blocks: ABC users "caught on real quick," Linnick says.

SMALLER STILL

Two products that feature compact size, as evidenced by their names, are the Aston Wallet and the Rank Cintel Pocket. According to a source from Paltex Imaging Systems (a division of British firm Paltex International), the Wallet and Pocket are in fact virtually identical machines made by Aston; Rank has an OEM agreement with Aston, and Paltex has taken over distribution of the Wallet. The chief difference is that the Pocket has a 601 device built in, while the Wallet will be adding one as an option soon. According to Paltex, the Wallet serves a general market while the Pocket is being marketed into installations that already have Rank equipment (the Wallet will not be sold in these installations).

Upgraded for NAB exposure, Wallet's keyboard was extended from a basic keypad to a full-alphabet QWERTY keyboard with function keys. In addition, a 105 Mb hard disk was added to its removable Winchester cartridge. The cartridge stores 42 images with key signals, and the fixed disk adds capacity for 99 more.

The Wallet/Pocket is not strictly plain vanilla; it can do some digital special effects and can stack images, which are processed in RGB or Y, R-Y, B-Y specs. A 100-image picture sequence/stack can be built. Paltex says a built-in process that takes about 20 seconds removes NTSC or PAL artifacts, and three optional processing techniques can remove interfield flicker. Once the image is processed, it can be stored clean.

Pocket processes in 4:2:2:4; Wallet is 4:2:2. Without the 105 Mb disk, Pocket storage is a bit less, however, with a fixed 40 Mb hard disk drive and a 44 Mb removable one. Pocket stores are output in accordance with the CCIR REC 601/656 standard; a linear key included with the stored image can be recalled with the image, if desired.

As with compact size, low price is part of the marketing package for these smaller still stores. Prices quoted to *Television Engineering* are $22,200 for the Wallet with the 40 Mb hard drive and another $1,200 for the 105 Mb drive configuration.

Video Park post house in Baton Rouge, LA has one Wallet to free up the Aurora 280 paint systems in its two edit suites. Besides the paint systems, Video Park has three Ampex VPR-300 D-2 recorders, one Sony Beta VTR and two Ampex units, two Sony 800 ¾-inch machines, four Ampex VPR-80s and two Ampex ADO-2000s in its suites.

Doug Foval, engineer at Video Park, says the Wallet saves time and "a lot of pain and agony." A major use of Wallet is for storage of car logos. Prior to having the Wallet, getting a logo meant going through the paint system, tying it up—sometimes for hours—and making everybody's job more difficult. With car logos now stored on the Wallet, access to a logo is eased. "We pop in its number, and it pops up," says Foval. Because Wallet uses removable disks for storage, Video Park even gave one major client their own disk of stills.

Carousel, Quantel's still-store product, offers 4:2:2 component digital storage, and connects digitally with Quantel's Paintbox to maintain the picture quality of images Paintbox has worked over. Main controls for Carousel appear as additions to a Paintbox menu. Because it conforms to CCIR 601, Carousel can also connect to other 4:2:2 sources, including D-1 digital VTRs, the Quantel Harry edit suite, and telecines.

The company touts the storage capacity of Carousel in terms of real-time video: 13 seconds (about 380 frames). Carousels can be strung together—up to 16 of them—as one large storage device.

Michael Taylor, technical director of the Effects Animation Design Group at Editel, Chicago, has a Carousel hooked up with Paintbox in one room, and Paintbox and a Harry in another. "The menu structure with Paintbox is important to our artists," says Taylor, pointing out that artists "don't have to pause in their thought process" when working from graphics device to storage device.

Taylor also finds the Carousel to be versatile, explaining that with the control port for external controls, it

Left: Asaca's ADS-300 still store is now available in the U.S. Right: Alta's Centaurus combines digital effects with still storage.

can be used as a digital VTR. It also functions as an extension of Paintbox's storage capacity.

Storage capacity of Carousel is, however, one minor drawback for Taylor. A 15-second commercial, for example, has to be broken into 10-second and five-second segments. But Taylor likes the speed of RAM storage. Also, since rotoscoping and retouching can be done with the Carousel/Paintbox combination, Taylor can charge clients who need only those services lower rates than he would have to charge for use of Harry.

Another digital unit, Dubner's DSS-4, offers 200 Mb of internal storage and a 20 Mb removable disk. Additional disk drives can be added. The dual-channel (program/preset) DSS-4 includes Dubner paint basics and the ability to do wipes, dissolves, fades and cuts. In addition, optional software can add more painting capabilities, along with animation and drawing potential.

NEW KIDS ON THE BLOCK

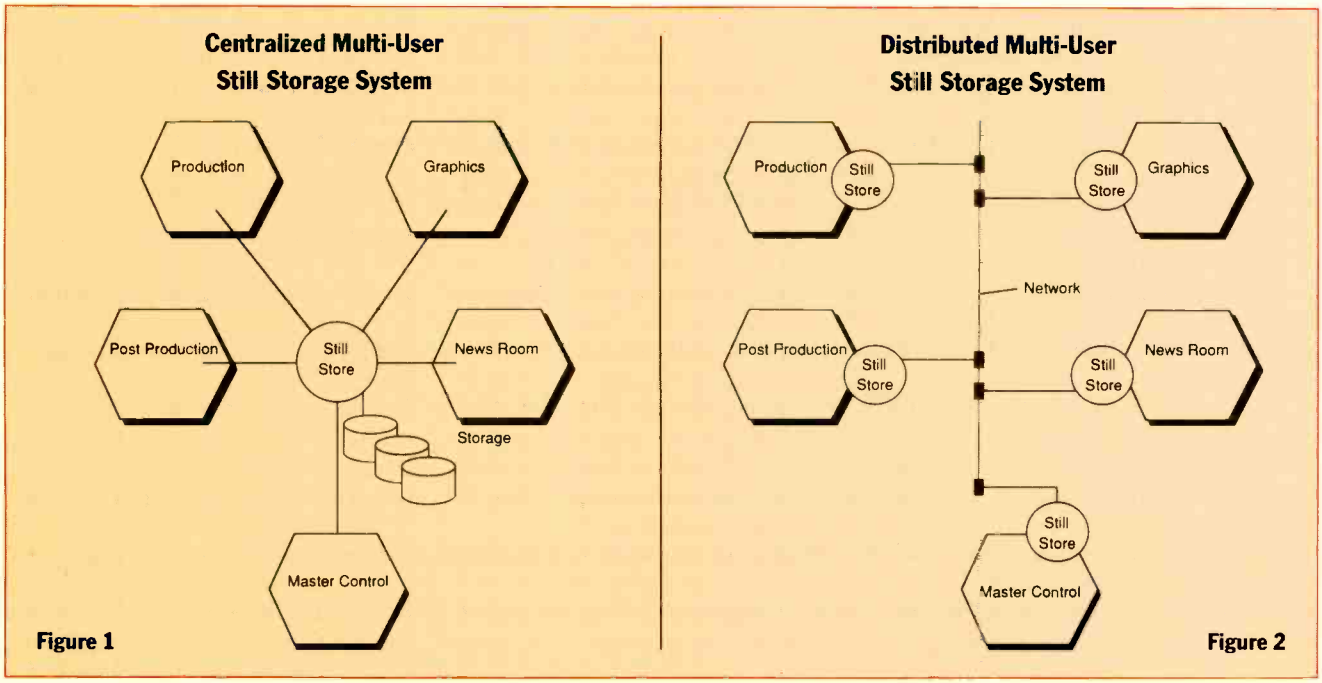
Current standalone players will have to "hang tough" with three new makers now setting their sights on the U.S. market: Accom, Asaca/Shibasoku and Sony.

New at NAB, the Accom DIS 422 rounds out the low-end price competitors with prices starting at $19,500. It stores in 4:2:2 component digital, and has basic storage space for 100 images. Optional disk drives can expand storage to 600 images, and a removable media drive can also be added. The DIS 422 has a control panel with 31 keys instead of a QWERTY keyboard, but the panel includes a trackball.

Configured primarily as a still store for telecine applications, the DIS 422 allows comparison of live, grabbed and stored images through windowing or wipes. An Accom Value Trak feature measures and compares the RGB values of selected points on two images. Though film-to-tape and tape-to-tape applications are now the most likely uses for the DIS 422, Accom is planning other configurations.

BIG GUNS

Enter Sony, which is attempting to combine the versatility of a standalone store with the power of archival storage. Sony's DNS-1000, announced at NAB, will be available for delivery late this year. With this model, Sony



"I would have trouble justifying an integrated system, because if one piece goes down, you lose the whole system."
—Rex Colby, Leitch DSF-3100N user, KOLO-TV, Reno, NV

enters the still-store market with both guns blazing. The DNS-1000 incorporates a few key innovative features in an effort to provide users with all they need from a still store.

Though the DNS-1000 comes in at the higher end of the price scale, Sony says price and efficiency were two major targets. Peter Dare, VP of product management for Sony Broadcast Products, says the DNS-100 "provides archive-quality capability at an affordable price." The DNS-1000 includes a WORM (Write Once, Read Many) disk drive and an optical 5¼-inch drive.

Sony is banking on the 12-inch transportable WORM disk to offer cost advantages. With the WORM's storage capacity of 1,800 images, Sony claims that use of the device can greatly reduce the cost of image archiving, from about $4 per still to less than 25 cents. Of course, users still want to be able to reuse disk space, and so the 5¼-inch drive takes a rewriteable disk capable of storing 500 images. Images will be stored in 4:2:2 format whether they enter the system as composite or component analog. Full bandwidth 4:2:2:4 is available as an option. Four wipes and dissolves are possible, and an option will add compression capability.

Another major advanced feature for the Sony system is the incorporation of mouse technology, innovated by the Apple Lisa and Macintosh computers. A mouse is an alternative to keyboard entry of commands; it lets the user move the cursor around the screen by hand-rolling a device on a desk. By clicking a button on the mouse, you can select a menu item. The mouse, along with an Instant Recall option, lets you send a slide online in under .04 seconds, according to Sony.

Massive storage needs can be handled by a "Jukebox" addition, which stores 50 WORM disks, allowing online access to over 90,000 stills. And you can add more than one Jukebox.

Sony will also offer an Ethernet distributed network option for multiple-user potential. Here, too, the capacity is enormous. Each mainframe still store supports six users, who can share 42 disk drives.

Sony revealed two list prices to *Television Engineering*: $47,210 for the DNS-1000 PAC 1 (an all-digital, single-user system with serial digital component input/output only); and $93,000 for the DNS-1000 PAC 4 (analog/digital, two-user system with digital component I/O only, with two A/D and four D/A converter boards to allow analog composite and component I/O, as well as serial component I/O).

Another high-end still store is Asaca/Shibasoku's ADS-300, which will sell in the U.S. for about $59,000. The unit stores images in 4fsc composite digital, and includes a 650 Mb removable cartridge. Seven optional dual disk drives can be added. Sixteen play lists can be created, and "skip" and "back" functions allow scanning through play lists prior to on-air transmission. Switching from one still to another on-air can be jazzed up through three-speed dissolves, wipes or pushes, as well as a plain cut. Trim and positioning of images is also possible, as are image rolls. The ADS-300 is a single-user machine, but can handle two functions simultaneously: A user can sequence images while the unit is transmitting on-air.

Besides use as a very sophisticated standalone, the ADS-300 can serve multiple-user needs through an Ethernet local area network. Also, a cart machine capable of handling 2,400 disc cartridges is available.

Asaca also has an ADS-7800 multiple-beam still store for HDTV applications, which transfers images at the rate of two high-def frames per second. Price tag for the HDTV still store: $350,000.

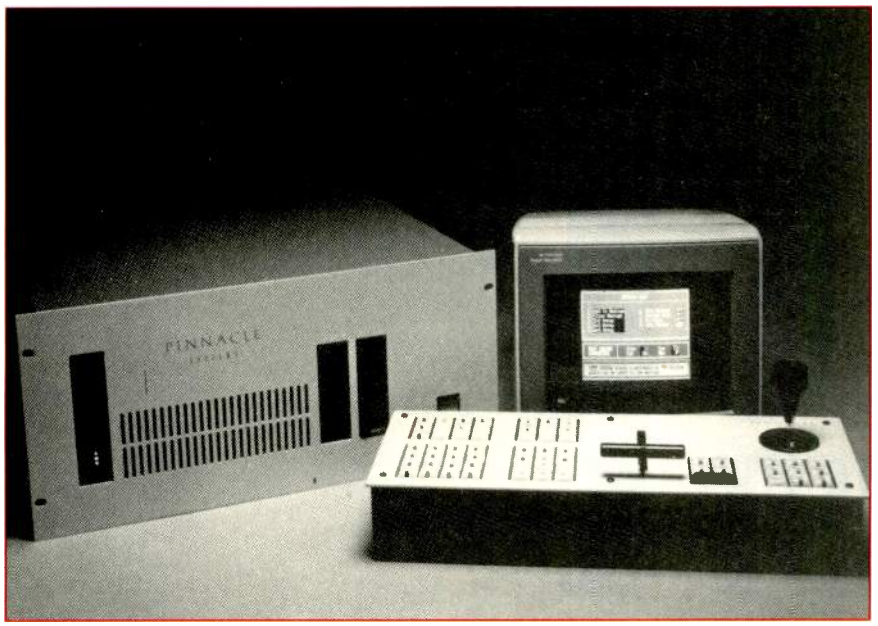
INTEGRATED STORES

Some manufacturers take another approach to the need for still storage. Rather than offer it in a standalone unit, they tack it onto another device or offer it as a module in a workstation.

Pinnacle Systems, Santa Clara, CA, for example, offers still storage starting with the 2120 module in its 2100 workstation. The 2120 module lets users store and retrieve up to 280 images (180 in PAL). This module also provides other capabilities, such as manipulating live video over retrieved images. A downstream keyer option allows tri-level video effects: The operator can key retrieved images and processed video over a live video background. The 2120 includes a 3½-inch floppy and built-in Winchester disk drive.

Pinnacle says most customers begin to build their 2100 workstation with the 2110, which is one step below still storage. Users can then upgrade through hardware and software enhancement to the 2120, 2130 or 2140. (The 2130 adds advanced painting capabilities, and the 2140 adds 3-D modeling and animation.)

The 2100 is actually a 1989 upgrade of the four-year-old 2000 series, which also had a still store, the 2020. Walter Werdmuller, VP, sales for Pinnacle, says the 2100 offers "the type of improvement the customers were looking for," including better encoding, decoding and filtering, as well as new sequencing software. The



Pinnacle 2100 Series Workstations provide picture storage and manipulation capabilities in one package.

2100 is a success, with 900 sales, including at least 300 for the 2120, according to Werdmuller.

Marc Luedtke, director of operations for KSNW in Wichita, KS, uses a 2020 with the Prizm software option to produce commercials. Luedtke, who says his station has a "mix of stuff" and is in a transition period to the newer technology, explains that an "old" Harris still store (with eight-inch tape) is being used for on-air applications. An NEC E-flex serves double duty: on-air and post.

Luedtke likes the versatility of the Pinnacle system. "It gives you everything in one neat package," he says, noting that he was impressed with the resolution of pictures when reviewing the system. "Edges were sharp, moves smooth." Ease of use was another factor in Luedtke's choice; he felt the Pinnacle was easier to learn and operate than some other big-name systems he reviewed. He says the station's production director learned the system's basics in a couple of days without formal training.

Perhaps the key feature for Luedtke was the free software upgrades; he knows of at least one other maker that makes you pay for upgrades. The software factor may be behind the rapid market changes he has seen in the past year. "More makers are going to software-driven rather than hardware-driven systems. With software, you get to make changes without buying a board; they send you a disk. Before, you had to buy a board or chip."

HALF AND HALF

Centaurus from the Alta Group, San Jose, CA is billed as a dual-channel digital-effects and still-store system. Though it fits with the lower-priced standalones at $24,500, Centaurus is designed to be an integrated solution to production and storage needs.

Processing format for the Centaurus is component, offering eight-bit resolution and 14.318 MHz sampling. Centaurus has an internal 60 Mb drive and a 500 Mb external drive, with a 40 Mb removable disk pack available as an option. Input and output is composite.

That's the storage half. The effects half features nine wipes and nine digital effects, including mosaic, mosaic dissolves, posterization, pushes, pulls and strobing. Two-channel picture freeze and time-base correction go along with a 4 x 2 audio mixer and a downstream keyer to fill out the multifaceted unit.

Alta admits that the Centaurus is used mostly as a still-storage device, and the unit includes a serial interface with the Grass Valley 100 RS 422 protocol. That makes it compatible with Grass Valley, Paltex, Convergence, Sony, United Media and Calaway editors.

But the extra features of the Centaurus do give it some added value. Though chief engineer Francis Wilson of KTRV-TV, Nampa-Caldwell, ID regularly uses the Centaurus as a still store, he found use for its special features during a remote from a shopping mall.

"We used the Centaurus as a camera switcher and also as a special-effects box," Wilson explains. "While these functions are above and beyond our normal application, they are possible because the Centaurus contains a dual-channel TBC/frame synchronizer and video switcher," he adds.

CHARACTER STILL

Chyron unveiled its new Infinit! model at NAB. Basically a two-user character generator, Infinit! sells for $58,500. A video capture board for $7,000 adds the capability to store 80 Mb of stills. Wipes, dissolves, pushes and pulls are possible, and an option transforms a two-dimensional graphic so that it moves in 3-D space. According to a Chyron representative, this kind of flexibility is possible because Infinit! treats a picture as if it were a character.

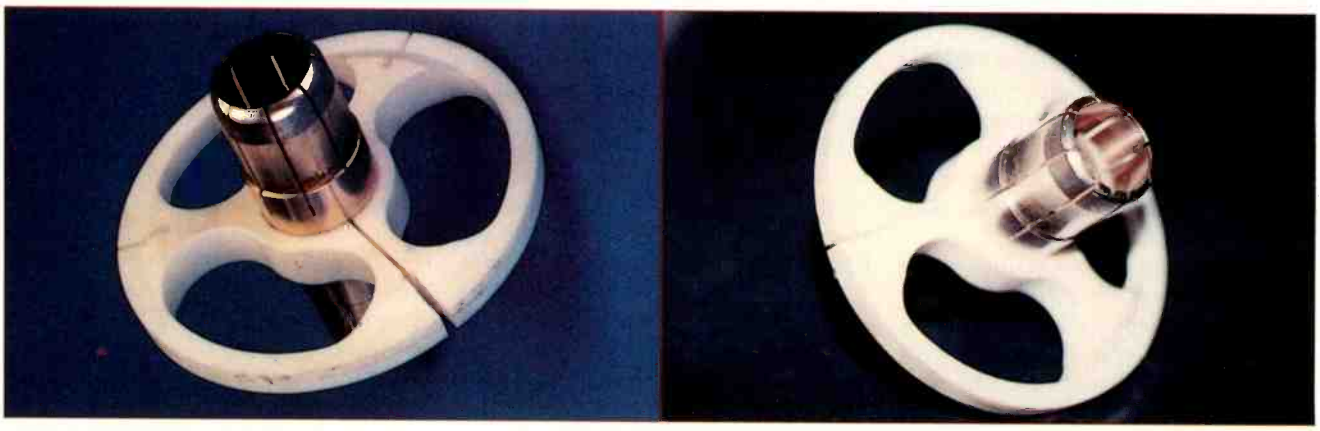
The integration of still storage, graphics, store management and, of course, character generation should make Infinit! very popular, says Chyron, adding that as of NAB '90, 40 Infinit!s had already been shipped.

The still-storage field is getting crowded, and it may get even more crowded soon. Nova Systems, Canton, CT is reportedly developing a standalone still store. According to a Nova representative, most of the planning has been done, but market timing and pricing have yet to be worked out.

As with all of the new technology devices available, it is important to start with your own needs and work from there to avoid paying for features you will not use. But the new still stores do offer many possibilities that leave the old technology standing still. ■

RF TEST & MEASUREMENT:

Attracting today's finicky viewers requires top-quality programming —and a top-quality signal.



DELIVERING THE GOODS

By William A. Owens

"You're listening to the hot-rockin', flame-throwin' Z-100, where we're going from worst to first!"

Shouting that slogan over the airwaves, DJ Scott Shannon made good on his promise, taking New York's WHTZ-FM from a sleepy little station playing "101 Strings"-type elevator music to a booming, top-rated powerhouse. Of course, the change in musical menu was a factor, but the ratings leapfrog over New York's other rockers was also driven by top-notch technology and creative engineering.

Folks in the radio business have

known a little secret for many years. If a radio station sounds better than any other, chances are it will have more listeners than any other. When Malrite Communications purchased WVNJ-FM, they added a new antenna and transmitter, new studios, and tons of signal processing. With new equipment, and new calls, the newly formatted WHTZ-FM went from "worst to first" in the New York ADI ratings in a few short months. Technically, it sounds great.

What does this have to do with television engineering? If the better-sounding radio station attracts more listeners, would it not then follow that the better-looking television station would attract more viewers? What about the better-looking program? Do more people watch Peter Jennings on ABC than Dan Rather on CBS because they think Jennings does a better newscast, or because—in the opinion of many—ABC's video is consistently brighter and crisper than the dark backgrounds and moody lighting of Rather's newscast?

Because television advertisers want their commercials to reach the largest possible numbers of eyeballs, broadcasters need to use every available technique to attract the greatest number of potential viewers. And many folks in station management are finding that the way to do it is to deliver a high-quality, well-engineered television signal.

Those who have been in broadcasting for a while have heard the line "It's leaving here okay." "It," of course, is the television signal. If it's leaving "okay," that means that, at least at the transmission point, the signal looks good. The old attitude was that once the signal is "out there," it's out of our hands and no longer our problem. Why worry about signal quality, as long as it meets FCC specs?

In the competitive environment of the '90s, station engineers cannot take that kind of position. They need to deliver a high-quality signal, one that will draw to it today's generation of video channel-grazers. And no matter what the engineers do in the TV studio, the place where it matters most is that big boom box, the transmitter. It had better be a signal worth watching. And that's the point. You need to know that the signal you're putting out is the very best, and you need the means to verify that.

With the introduction of digital tape machines, switchers, effects devices, and the associated digital/analog and analog/digital converters into the video chain, more care than ever before is necessary to ensure the signal's pristine quality.

The video signal does quite a bit of traveling from its creation at the camera head or tape machine, until demodulation at the viewer's television receiver. At each major point along the way—camera control, tape room, master control, and finally at the transmitter—high-quality monitoring equipment is necessary to ensure that the signal delivered to the transmitter is exactly the same as when it started along the path.

LEAP INTO THE AIRWAVES

But delivering the goods requires more than careful monitoring at one point or another. A consistent approach to quality at all levels is necessary, but most critical is the end of the signal line, where the former composite video signal, converted to radio frequency, begins its final journey up to the antenna, before making that giant leap out into the airwaves.

Let's face it, test equipment isn't very sexy. Your latest Betacam gear might blow away the competitor's ¾-inch field equipment, and that new cart machine cooking away unattended hour after hour on-air might make your controller happy, but top management isn't going to get excited over the latest box that makes wiggly green lines. But, if you look at it from the standpoint of increasing the number of viewers by improving picture quality, then you're talking a station manager's language.

The basic television transmitter consists of two similar subsystems, one each for visual and aural signal generation. The transmitter receives a video input signal, modulates a radio frequency carrier, and amplifies the signal to feed the broadcast antenna. Also received are one or more audio input signals, which are modulated into a separate radio frequency carrier, and amplified to feed the broadcast antenna.

Just before entering the antenna path, the visual and aural RF signals are filtered and combined to produce a complete, broadcast-ready signal. A color notch filter attenuates the 3.58 color subcarrier to meet FCC specifications. Harmonic filters are used to control radiation characteristics of the signal, providing attenuation of the second harmonic of the visual and aural carrier's operating frequency. Finally, the visual and aural signals are married via a notch diplexer, combined to feed a common antenna.

Of course, that's a simplification. There are differences between VHF and UHF, high-power and low-power, solid-state or tube. Since almost every new television transmitter is custom-made for its particular application, there are as many variations as there are transmitter manufacturers and customers. And broadcasters using a large-scale transmitter with several operational modes have most likely added a switchless combiner to the signal path, for fast and easy system reconfiguration.

TRANSMISSION CHECKOUT

The groundwork for a high-quality RF signal is put into place during the initial installation of the transmitter, transmission line and antenna. According to Walter Pries, field service manager for Micro Communications, Inc., careful installation is essential for high performance. Pries told *Television Engineering*, "Thorough testing of the system from amplifier out-

Left: Typical worn inner connector shows wear marks and scratches on both inner connector and insulator surfaces. Right: Inner connector shows no excessive or abnormal wear.

put to antenna is required to provide high-quality transmission."

Pries suggests a complete checkout of the transmission line, looking for impedance mismatches, directionality of couplers, and correct tolerances at elbows, flanges and inner connectors. Particular attention should be paid to transitional sections. This will allow correction of any problems before they can have an adverse effect on the broadcast signal. Pries also pointed out that all possible signal paths within a given system should be tested, not just the normal operational configuration. This will ensure optimum performance in those emergency situations when you need it most.

Once a transmission system is up and running, constant monitoring of its operation can help spot minor problems before they graduate into the Major League. While many have systems that automatically take transmitter readings, how many make a careful study of those readings to see what's actually happening to their system?

Dana Myers, Harris Corporation's lead customer-service engineer and transmitter operations instructor, believes that a transmission system will let you know if there's a problem. According to Myers, stations should "initially establish a baseline of performance data to compare against ongoing operations."

A comparison of optimum performance against day-to-day performance can help spot trends, particularly problems with VSWR. Myers says it is important to look at the big picture: "Some things can change without affecting on-air operation." He points out that variations in VSWR could be caused by changes in environmental temperature, rather than the onset of some problem. In addition to watching the meters, Myers adds that it is important to keep an eye on the on-air signal, emphasizing, "A noise problem, or flashing, streaking or break-up in the picture might be caused by a bullet heating up."

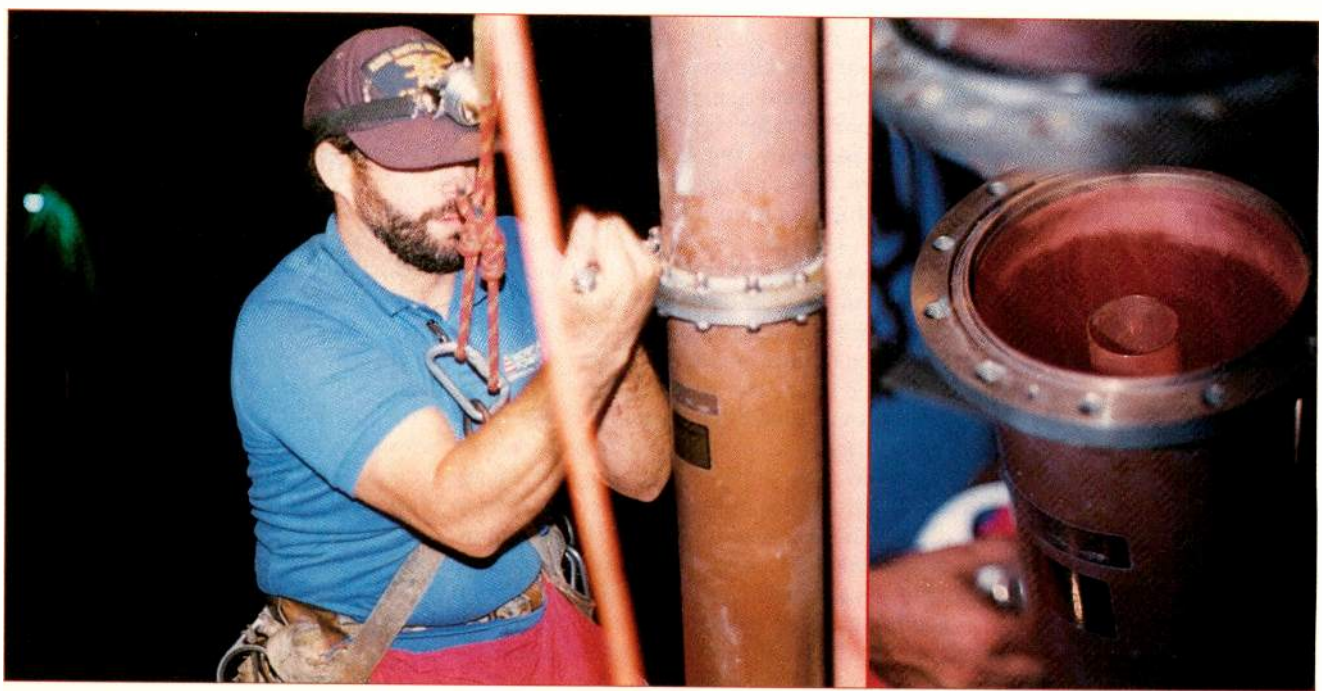
STORMS AND BULLET HOLES

But a high-quality signal requires more than just watching meters and monitoring off-air. According to Joe Zuba, director of marketing for Dielectric Communications, engineers should know their transmission plant from the ground up.

"You need to keep watch for normal wear and tear, and for those acts of nature that can cause problems," Zuba told us. You need to watch for transmission-line damage due to weather conditions, such as lightning storms or falling ice.

But Mother Nature is not the only problem engineers face. Many believe that television transmission systems are great for target practice. It's amazing what a small bullet hole in the transmission line can do to a television signal. And beyond intentional damage are man-made problems that are unintentional. "Improper tuning or damage in the transport of critical parts can affect transmission performance," Zuba notes.

One who believes in careful monitoring is Ernest Mayberry, a systems engineer with LDL Communications. "Once an RF system is properly installed and operating, we recommend that the signature profile [return loss measurement and time-domain response] be redone every couple of years to ensure proper operation," he says. "Transmission line and antenna



Left: Taking apart the transmission line for inspection. Right: Inspecting the inner surfaces of outer and inner line segments.

system installations older than 10 years should be checked more often."

The wear and tear, the use and abuse of a transmission system by Mother Nature and by man require watchful attention by those who know what to look for in the system's operation. A well-trained, experienced operator can spot those little changes in operating conditions that might signal a problem.

The first line of defense is therefore a trained, experienced operator, and the tools to help analyze the available information. Just logging data is of no help. Transmitter performance must be monitored and compared against established benchmarks. Irregularities need to be investigated, and their cause determined. A simple comparison of the input signal versus the demodulated output can provide a wealth of information.

During construction, a variety of measurement instruments are used to help fine-tune a transmission system. Key to that process are a spectrum analyzer and network analyzer.

Of course, few stations can afford to buy the specialized equipment to do the kind of testing that an installation crew would do. That's why in most cases, stations use outside contractors for full-scale system testing. And with the smaller engineering staffs of most stations, there is little time to make serious evaluations of equipment operation.

Perhaps, too, the lack of down time for testing is a result of the reluctance of many managers to allow off-air time for the necessary engineering functions, operating under the theory "If it ain't broke, don't fiddle with it." Sometimes, you just don't get the time you want to check things out. Until it's too late.

So you come to depend on those day-to-day observations. And for everyday use, the best tools of the trade are those test devices with which we're all familiar: the waveform monitor, vectorscope and spectrum analyzer. With proper operation, they will tell you almost everything you need to know, and when combined with careful monitoring of your transmitter readings, will help make sure you're delivering the goods to your audience.

For engineers working in today's more competitive environment, the old adage about the signal "leaving here okay" covers only half the battle. Delivering the goods means not just that the signal is *leaving* okay, but that the signal is "arriving *there* okay" as well.

You can't visit every home in the viewing area to make sure you are coming in bright and clear. But you can take the time and effort to make sure that everyone charged with operating your transmitter knows how it works, and what to keep an eye on. And that will help ensure that the viewers will be keeping an eye on your station. ■

Metal "Shavings" Can Shave RF Performance

The critical link between transmitter and antenna—the transmission line—is subject to the whims of nature. In the typical rigid coaxial line, expansion and contraction due to changes in temperature can result in wear on both the conductor and inner connectors. This wear can produce metal shavings that contaminate the line. Over time, the build-up of metal shavings on the line insulators could create a current path from inner to outer that could result in a flashover. In addition, with the silver plating worn away, surface contact is reduced, increasing contact resistance and resulting in greater power loss and potential local hot spots. All of which can seriously degrade signal transmission.

The photos shown here were taken at KUVN-TV, Channel 23, Garland, TX, test site for Andrew Corporation's MACXLine, which utilizes an integral bellows segment built into its inner conductor. According to Tom O'Flaherty, product line manager, Andrew Broadcast Products, the MACXLine concept represents a "perfect solution for the problem of conductor expansion and contraction." O'Flaherty told *Television Engineering* that over 25 sites are now equipped with MACXLine, and several operators are considering the replacement of their existing inner conductors to improve RF transmission performance.
—*W.A.O.*

Directory of RF Test & Measurement Manufacturers

Allied Electronics
Anritsu
Audio Precision Inc.
Avcom of Virginia
BTC Test & Measurement
Belar Electronics Lab Inc.
Bird Electric Corp.
Boonton Electronics Corp.
Coaxial Dynamics Inc.
Electro Impulse Labs
Fluke Manufacturing Company Inc.
Hewlett-Packard
Hitachi Denshi America Inc.
Holaday Industries Inc.
Leader Instruments Inc.
Magni Systems Inc.
Marcom
McMartin International
Minolta
Narda Microwave
RE Instruments
Rohde & Schwartz
TFT
Tektronix
Videotek

STATION EQUIPMENT BUYING 1990

Television Engineering *continues its exclusive study of purchasing trends among TV stations. This month: equipment purchasing budgets in 1988, 1989 and 1990.*

By Peter Caranicas

Every TV station chief engineer and general manager knows the size of his equipment budget and whether it is going up or down. But how does that budget stack up against what other stations of a similar size are doing? And, for the industry as a whole, is spending on equipment rising or falling, and by how much?

To answer these questions, late last year *Television Engineering* commissioned a scientific survey of TV station spending patterns on hardware, reaching a random sample of 245 buying sites (see box on "Methodology"). We are presenting the results of this study in a series of three articles.

In May, Part I focused on the role of station engineers and others in deciding what equipment to buy. This month, we quantify station equipment purchasing budgets. And next month, Part III will analyze buying intentions for 14 product categories. We'll also present our findings on stations' intentions in the area of digital recording, and opinions on HDTV.

WILD PATTERNS

As of the end of last year, 11% of TV stations in the 150 largest markets had no plans to purchase any equipment at all in 1990. Among the 89% that did plan to buy, spending would be almost flat compared to 1989.

More specifically, the average station's expenditures on equipment rose from $563,000 in 1988 to $613,000 in 1989, an increase of 9% (see chart). By contrast, it was estimated that 1990 equipment expenditures would rise to only $621,000, a mere 1% increase—and an actual decrease if inflation is taken into account.

However, when this spending is broken down by station size, a more complicated and wildly varying pattern emerges. For the purposes of analysis, our researchers divided the universe of stations into four categories: those in markets 1 through 25, 26 through 50, 50–100, and 101–150. The markets themselves are defined by Arbitron Television on the basis of data supplied by the U.S. Census Bureau and the broadcast industry.

Stations in markets 1–25 range in size from New York, Los Angeles and Chicago (numbers 1, 2 and 3) to Hartford/New Haven, San Diego and Orlando/Daytona Beach (numbers 23, 24 and 25). They serve fully half the U.S. population and are the most likely to be able to afford expensive hardware. Equipment budgets at these sites leapt from an average of $862,000 in 1988 to $1,203,000 in 1989—only to fall back to an estimated $986,000 this year (see chart).

Markets 26–50, which are medium-sized, range from Indianapolis and Portland, OR (numbers 26 and 27) to Greensboro/Winston Salem, NC and West Palm Beach/Fort Pierce, FL (numbers 49 and 50). Equipment expenditures there took on a pattern exactly the reverse of the one seen at the larger stations. Average equipment budgets dipped from $701,000 in 1988 to $495,000 in 1989, but were expected to rise significantly this year to $873,000.

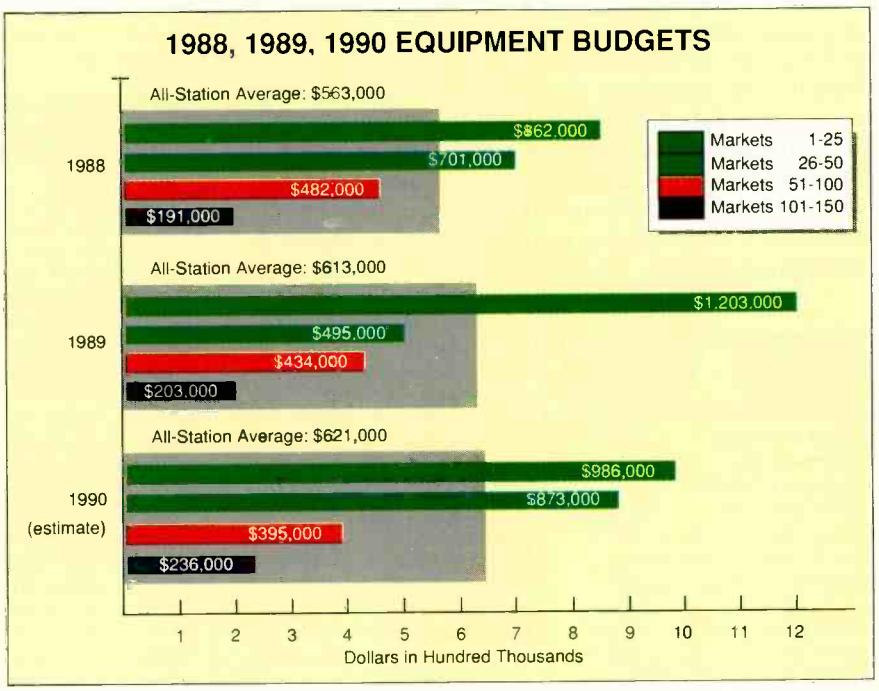
Stations in markets 51–100, which range in size from Albuquerque, NM (51) to Sioux Falls/Mitchell, SD (100), are seeing a steady drop in their equipment expenditures. In 1988, the average station in this category spent $482,000 on hardware; in 1989, the amount fell to $434,000; and this year it is projected to fall still further to $395,000 per station.

By contrast, stations in the small markets, from 101 (Fort Wayne, IN) through 150 (Lubbock, TX), are seeing a steady rise in equipment expenditures. In 1988, the average station in this category spent $191,000; in 1989, that number rose to $203,000; and this year it is estimated that it will rise to $236,000.

Methodology

Television Engineering commissioned the TV research firm Frank N. Magid Associates to conduct an equipment-purchasing survey among television broadcasters in the nation's 150 largest markets. These stations reach 95.85% of the total U.S. population. In late November and early December of 1989, Magid telephone interviewers reached a random sample of 245 stations in these markets, out of a total universe of 875 such stations. The resulting margin of error is plus or minus 5%, and the survey's findings are projectable to that entire universe of stations.

The researchers asked to speak to the person "most familiar with the station's technical equipment . . . and the purchasing of it." Most of the survey respondents had engineering titles, with 69% being chief engineers or assistant chief engineers, and 14% directors or managers of engineering. Twenty percent of the respondents worked at stations in markets 1–25, 17% in markets 26–50, 31% in markets 51–100, and 23% in markets 101–150. Twenty-one percent were ABC affiliates, 22% were affiliated with CBS, 20% with NBC, 13% with Fox, and 23% were independent. ■



FORETELLING TRENDS

Clearly, stations in the 25 largest markets are the locomotive controlling the industry's overall statistics. Their average equipment budget of $1.2 million in 1989 raised the overall average for the entire universe. Moreover, this significant group's cutbacks in 1990 are the single most important factor responsible for the overall stagnation in equipment sales to call-letter stations this year.

And yet, the buying wave that hit the large stations last year seems now to have trickled down to the second category—stations in markets 26–50. While the average station in this category saw its equipment budget plummet from $701,000 in 1988 to $495,000 in 1989, expenditures are expected to rebound energetically this year. In fact, the per-station average in this second category is estimated to reach $873,000 in 1990, which is just slightly below the total dollar amount to be spent by the typical much-larger 1–25 station.

If this is in fact a trickle-down phenomenon, then stations in the 51–100 category may be the most likely candidates for increased expenditures in 1991—or perhaps 1992. This possibility should be noted by hardware manufacturers and other marketers to the TV industry. Additional research to be conducted by *Television Engineering* later this year will further clarify these patterns.

Meanwhile, stay tuned next month for a product-by-product analysis of station purchasing plans for 1990. ■

NEW TECHNOLOGY BUYER'S GUIDE:

AUDIO, PART II

A supplement to our April audio-for-video directory, cross-referenced by product category.

In April's issue, we published a directory of audio-for-video products from a variety of manufacturers. However, that list left out some manufacturers, so we decided to run Part II. This listing does not include the companies that appeared in Part I.

Companies are listed alphabetically with addresses, phone numbers and products (including model numbers when provided). Following this listing is a cross reference by product, with company names listed under applicable product categories.

—John F. King

A

Allen & Heath
5 Connair Rd.
Orange, CT 06477
(203) 795-3594
Sabek, Sigma, Scepter, SR, SC and Studio 12 audio mixing consoles for recording and post-production applications; CMPTE synchronizer for CMC series consoles; Sigma, Sabre and CMC series consoles.

Ampex Recording Media Corp.
401 Broadway, M.S. 22-02
Redwood City, CA 94063
(415) 367-3888
Audiotape: 406/407 mastering; 456 Grand Master; 467 digital mastering; 467 U-matic and R-DAT cassette; 472 studio cassette; 478 low print mastering; 615/616 cassette duplicator; 619/620 chrome cassette duplicator; 631/641 open-reel duplicator; 631/641/651/661 open reel; 632/642 professional open reel; 632/642 professional open-reel duplicator; 672 professional cassette. Videotape: 175 two-inch broadcast quadruplex; 187 ¾-inch U-matic broadcast videocassette; 188 ½-inch Betamax Professional videocassette; 189 ½-inch VHS Professional videocassette; 199 VHS Broadcast videocassette; 196 one-inch Master Broadcast; 197 ¾-inch U-matic Master Broadcast videocassette; 297 ¾-inch U-matic SP Master Broadcast videocassette; 198 ½-inch Betacam Broadcast videocassette; 298 ½-inch Betacam SP Master Broadcast videocassette; 219 19 mm D-1 Digital Master Broadcast videocassette; 319 19 mm D-2 Digital Master Broadcast videocassette.

The Audio Broadcast Group
2342 S. Division Ave.
Grand Rapids, MI 49507-3087
(616) 452-1652
Crown amplifiers, preamplifiers; Otari and Revox ATRs; Auditronics, Broadcast Electronics, Autogram, ATI, Broadcast Audio and Soundcraft USA broadcast consoles; Dyaxis-Studer digital workstations; ATI and Auditronics distribution amps; Sennheiser and AKG headphones; Auditronics IFB systems; EV, Shure, Sennheiser and Neumann microphones, accessories; Nakamichi, Marantz, Panasonic, Studer, and Denon miscellaneous recording/playback equipment; monitors; monitoring equipment; EV, JBL monitor speakers; Auditronics, Soundcraft USA and Ramsa post-production consoles; DBX, Orban and Aphex signal-processing equipment; Orban stereo simulators; QEI test & measurement equipment; Gentner telephone interfacing equipment.

Audiolab Electronics
5831 Rosebud Lane, Bldg. C
Sacramento, CA 95841
(916) 348-0200
Bulk tape degaussers; TD-5 Metal Tape Degausser (erases Beta SP and MII); TD-4A Degausser (erases DAT and reels up to 16 inches in diameter).

B

Belar Electronics Laboratory
119 Lancaster Ave., Box 76
Devon, PA 19333
(215) 687-5550
Monitoring equipment; test & measurement equipment.

D

DKW Systems
730, 9919 105 St.
Edmonton, AL
T5K 1B1 Canada
(403) 426-1551
Cabs: live assist, full automation, digital audio mass-storage systems, multi-CD players, optical disk jukeboxes; intelligent switching matrix interfaced to cabs.

G

Gentner Electronics Corp.
1825 Research Way
Salt Lake City, UT 84119-2348
(801) 975-7200
6x headset/speaker amplifier; IFB solutions; Microtel, Auto Coupler, TC-100 IFB systems; VRC-2000 transmitter remote-control system; routing DA; signal switchers; pre-wired patch panels; Audio Prism four-band processor; AM-Phoenix-NRSC-1 compliant processor; digital Hybrid II-Auto nulling hybrid; SPH-5 analog hybrid; SPH-5E Hybrid with frequency extender.

GLW (Harrison)
437 Atlas Drive
Nashville, TN 37211
(615) 331-8800
AP-100, AIR-790, PRO-790, TV-4 broadcast consoles; Series-Ten, TV-3, TV-4, PRO-790, MR-20 and MR-4 post-production consoles; ARS-9 audio routing switcher; Telos 100 control module for AIR-790 and PRO-790 consoles.

H

Harris Allied Broadcast Equipment
3712 National Road West
PO Box 1487
Richmond, IN 47375
(317) 962-8596
Broadcast consoles; computers, software, music libraries; digital workstations; distribution amps; headphones; intercoms; microphones, accessories; miscellaneous recording/playback equipment; monitors; monitoring equipment; monitor speakers; routing equipment; signal-processing equipment; stereo simulators; test & measurement equipment; telephone interfacing equipment; VU monitor displays.

L

Lexicon, Inc.
100 Beaver St.
Waltham, MA 02154
(617) 891-6790
OPUS random-access production system, OPUS/E random-access editing system; Z400 digital time compressor/expander, 480L digital effects system, PCM-70 digital effects processor, LXP-1 digital effects processor, LXP-5 digital multi-effects processor, MRC MIDI remote controller, CP-1 digital audio environment processor, CP-2 digital audio surround processor, 1300 audio delay synchronizer.

M

Mackie Designs
3910 148th Ave., N.E.
Redmond, WA 98052
(206) 885-7443
CR-1604 16-channel mic/line mixer.

Magna-Tech Electronic Co.
630 Ninth Ave.
New York, NY 10036
(212) 586-7240
Type 69-C magnetic reproduce amplifier; type 68-C magnetic record amplifier; 35 mm and 16 mm film heads in all formats—standard and long life; type MD-2036 dual film reproducers; type MR-10036, MR-4036 and MR-636-B film recorders and reproducers; EL-II automatic dialogue replacement systems for dialogue and foley recording; type-9F SMPTE/EBU time-code generator/reader with jam sync, user bits, and code synthesizer from bi-phase pulses.

Maxell Corp. of America
22-08 Rt. 208
Fairlawn, NJ 07410
(201) 794-5924
Audiotape: analog; digital mastering in ¼-inch, ½-inch, and one-inch; ¾-inch U-Matic digital audio cassettes; DAT cassettes in several lengths; IEC type I cassettes in several lengths (Communicator Series and Duplicator Series). Videotape: one-inch (BQ series) in several lengths; D-2 cassettes in small, medium or large sizes—all lengths; ¾-inch U-matic cassettes in several lengths; Betacam and Betacam SP cassettes, small & large; S-VHS cassettes (T-120 only); VHS cassettes in three grades in bulk & finished product; ½-inch duplicator and ½-inch sprinter pancakes; one-inch HDTV tape.

Micron Audio Products
210 Westlake Drive
Valhalla, NY 10595
(914) 761-6520
Microphones, accessories.

Microtran
145 E. Mineola Ave.
P.O. Box 236
Valley Stream, NY 11582-0236
(516) 561-6050
Microphone; transducer input transformers; bulk tape erasers; audio & power transformers.

N

Neumade
200 Connecticut Ave.
Norwalk, CT 06858
(203) 866-7600
Amplifiers, preamplifiers; post-production equipment.

P

Pesa America
2951 Woodbridge Drive
Bedford, TX 76021
(817) 267-6599
TB-8000 intercom; 101, 162, 40X, Series H routing equipment.

R

Radio Systems
110 High Hill Rd.
Bridgeport, NJ 08014-0458
(609) 467-8000
PA-1 phono preamp; RS series broadcast audio console; DA-16 distribution amp; RS-1000 DAT machine; RS-2000 audio cart machine; TM-2R timer; RS LED volume meter.

Rohde & Schwarz
4425 Nicole Dr.
Lanham, MD 20706
(301) 459-8800
Test and measurement equipment.

S

Samson Technologies Corp.
485-19 S. Broadway
Hicksville, NY 11801
(516) 932-3810
Broadcast consoles; computers, software, music libraries; IFB systems; microphones, accessories; miscellaneous recording/playback equipment; monitor speakers; post-production consoles.

Shintron
144 Rogers St.
Cambridge, MA 02142
(617) 491-8700
Distribution amps; routing equipment.

AUDIO BUYER'S GUIDE: PART II

Sony Pro Audio Div.
1600 Queen Anne Rd.
Teaneck, NJ 07666
(201) 833-5200
PCM-3348, PCM-3324A, APR-24, APR-5003V, APR-5002, TCD-D5PROII, PCM-2500, TCD-D10PRO, PCM-2000 ATRs; MDR-V6 headphones; ECM-44B, ECM-558, ECM-66B, ECM-778, ECM-MS5B, C-76, C-74, ECM-672, C-48, C-535, C-536, ECM-23F2, ECM-33F microphones, accessories; MXP-2900, MXP-290, MXP-3000, MXP-61 post-production consoles; SDP-1000, MUR-201, MU-E041, MU-2021 signal-processing equipment.

Soundmaster USA
900A Hampshire Rd.
Westlake Village, CA 91361
(805) 494-4545
Digital workstations; post-production equipment.

T

Tektronix, Television Div.
Box 500, Mail Sta. 58-699
Beaverton, OR 97077
(503) 627-1274
VM700A Option 40 audio measurement set; ASG-100 audio signal generator.

Timeline, Inc.
270 Lafayette St.
New York, NY 10012
(212) 431-0330
Lynx time-code modules; Lynx film-transport modules; system supervisor for console automation; keyboard control unit.

Trident Audio
2720 Monterey St., #403
Torrance, CA 90503
(213) 533-8900
Vector 432 32-bus in-line mixing console; T24 24-bus console.

V

Video Accessory Corp.
2450 Central Ave. #H
Boulder, CO 80301
(303) 443-4950
Distribution amps.

Videotek
243 Shoemaker Rd.
Pottstown, PA 19464
(215) 327-2292
ADA-16 distribution amp; APM-2RS and APM-8RS audio program monitors.

W

Ward-Beck Systems Ltd.
841 Progress Ave.
Scarborough, ON
M1H 2X4 Canada
(416) 438-6550
Broadcast consoles; distribution amps; IFB systems; intercoms.

Weircliffe USA
A Division of PALTEX INTERNATIONAL
2752 Walnut Ave
Tustin, CA 92680
(714) 838-8833
BTE line of magnetic media degaussers. Formats include Phillips cassette, DAT, R-DAT, two-inch open reel and 35 mm full coat magnetic film.

DID YOU KNOW ...

Your best resource for
FREE product information is in
every issue of Television Engineering:

TELEVISION ENGINEERING RAPID RESPONSE CARDS

Don't Miss Them! Turn to Page 51

AUDIO BUYER'S GUIDE: PART II

PRODUCT GUIDE

A cross-listing of product categories for manufacturers of audio-for-video equipment.

Amplifiers, Preamplifiers
The Audio Broadcast Group
Gentner Electronics
Magna-Tech Electronic Co.
Neumade
Radio Systems

ATRs
Sony Professional Audio

Broadcast Consoles
The Audio Broadcast Group
GLW (Harrison)
Harris Allied Broadcast Equipment
Mackie Designs
Radio Systems
Samson Technologies
Ward Beck

Computers, Software, Music Libraries
DKW Systems
Harris Allied Broadcast Equipment
Samson Technologies

Digital Workstations
The Audio Broadcast Group
Harris Allied Broadcast Equipment
Lexicon, Inc.
Soundmaster USA

Distribution Amps
The Audio Broadcast Group
Gentner Electronics
Harris Allied Broadcast Equipment
Radio Systems
Shintron
Video Accessory Corp.
Videotek
Ward Beck

Heads, Accessories
Magna-Tech Electronic Co.

Headphones
The Audio Broadcast Group
Harris Allied Broadcast Equipment
Sony Professional Audio

IFB Systems
The Audio Broadcast Group
Gentner Electronics
Samson Technologies
Ward Beck

Intercoms
Harris Allied Broadcast Equipment
Pesa America
Ward Beck

Microphones, Accessories
The Audio Broadcast Group
Harris Allied Broadcast Equipment
Micron Audio Products
Microtran
Samson Technologies
Sony Professional Audio

Miscellaneous Recording/Playback Equipment
The Audio Broadcast Group
Audiolab Electronics
Harris Allied Broadcast Equipment
Magna-Tech Electronic Co.
Radio Systems
Samson Technologies
Weircliffe USA
Microtran

Monitors
The Audio Broadcast Group
Harris Allied Broadcast Equipment

Monitoring Equipment
The Audio Broadcast Group
Belar Electronics Laboratory
Gentner Electronics
Harris Allied Broadcast Equipment
Videotek

Monitor Speakers
The Audio Broadcast Group
Harris Allied Broadcast Equipment
Samson Technologies

Post-Production Consoles
Allen & Heath
The Audio Broadcast Group
GLW (Harrison)
Samson Technologies
Sony Professional Audio
Trident Audio

Post-Production Equipment
The Audio Broadcast Group
Magna-Tech Electronic Co.
Neumade
Soundmaster USA
Timeline

Routing Equipment
DKW Systems
Gentner Electronics
GLW (Harrison)
Harris Allied Broadcast Equipment
Pesa America
Shintron

Signal-Processing Equipment
The Audio Broadcast Group
Gentner Electronics
Harris Allied Broadcast Equipment
Lexicon, Inc.
Magna-Tech Electronic Co.
Sony Professional Audio

Stereo Simulators
Harris Allied Broadcast Equipment
The Audio Broadcast Group

Tape
Ampex Recording Media
Maxell

Test & Measurement Equipment
Belar Electronics Laboratory
Harris Allied Broadcast Equipment
The Audio Broadcast Group
Radio Systems
Rohde & Schwarz
Tektronix

Telephone Interfacing Equipment
The Audio Broadcast Group
Gentner Electronics
GLW (Harrison)
Harris Allied Broadcast Equipment
Microtran

VU Monitor Displays
Harris Allied Broadcast Equipment

New Products

This month, and in our August issue, Television Engineering *uncrates new products that were introduced at NAB '90.*

VGV D3200 Digital Production Switcher

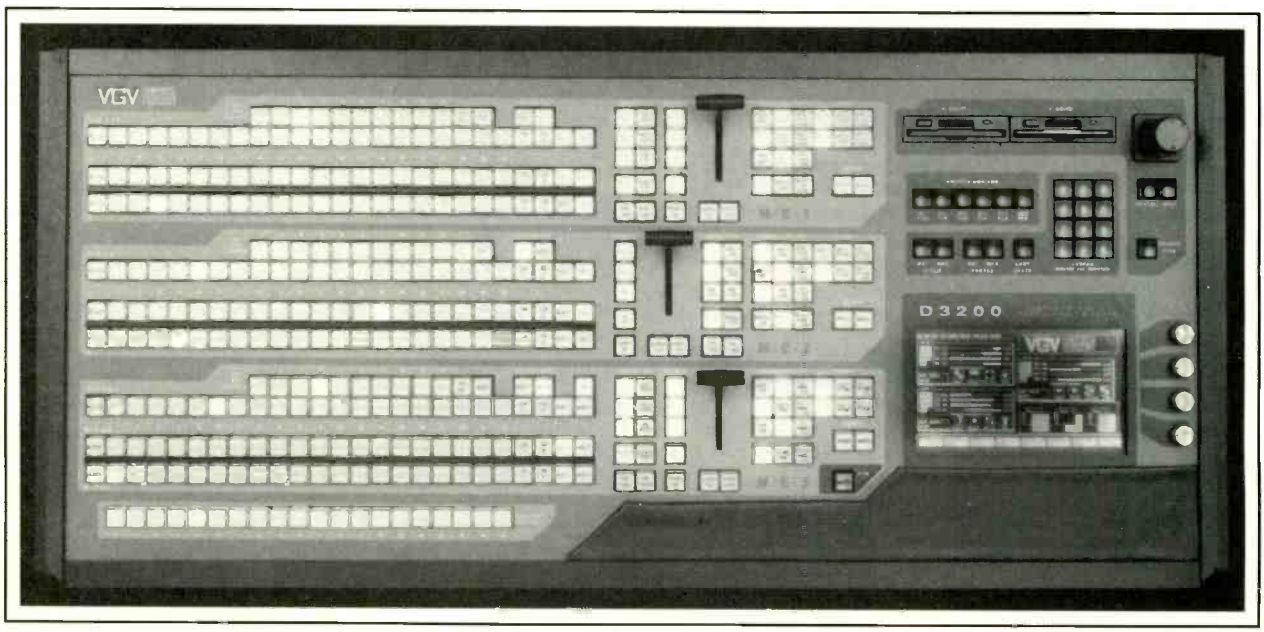
This composite digital video switcher offers a choice of eight- or 10-bit digital inputs, either serial or parallel, while maintaining full 16- and 32-bit internal processing. Introduced at NAB, the D3200 also features three multiple-level effects banks—each with priority transitions, key capture, flying shadows, four wipe generators and E-Z Mem advanced sequence automation. Through VGV's Phantom Analog Bus, this digital switcher can work with analog studio equipment.
Reader Service #200

TIMELINE Lynx SSL Data Interface

This NAB-debuted interface links the Solid State Logic (SSL) G series studio computer with ATRs, VTRs and film equipment through Timeline's Lynx system. Jointly developed by SSL and Timeline, the system is designed to solve compatibility and control problems in audio and audio post facilities. The interface expands the number of transports that can be controlled directly from the computer, and any transport can be designated virtual master or slave unit. All offset information, cue and mix data can be stored on the SSL data cartridge. The system can be retrofitted in the field and uses the Lynx RS-422 interconnect system and BNC cables. Options include: eight GPI closures for event triggering; three slaved time-code generators to drive external equipment; and MIDI time code output. Price: $1,800.
Reader Service #201

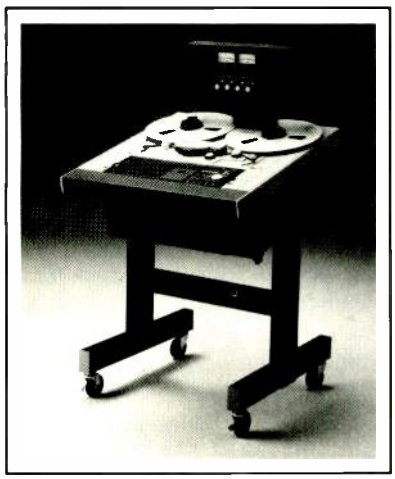
OTARI MTR-15 Studio Production Recorder

Displayed at NAB, this two-track studio/production recorder features extensive microprocessor control, us-



VGV

ing systems developed for Otari's MTR-100A 24-track machine. The MTR-15 offers automatic alignment of record and reproduce parameters, with the data for four different tape formulations at each speed and the equalization setting stored in a battery-backed memory. The tape transport includes a built-in four-point locator (with three one-touch cue points), and an LED tape counter that displays ips, cps, hours/minutes/seconds, hours/minutes/seconds/frames, or error messages. The MTR-



OTARI

15, which can be used in a 19-inch rack mount, on a table top or on a console, has Dolby HX Pro headroom extension circuitry; a built-in test oscillator; an internal monitor speaker; 12.5-inch reel capacity; four crystal-locked tape speeds; a cue wheel for shuttle/jog operation; and AES/NAB/IEC equalization presets. Available in ¼-inch and ½-inch NAB, ¼-inch DIN and ¼-inch center-track time-code versions. Price: $9,250.
Reader Service #202

PINNACLE DCC-21 Dual-Channel Combiner

Shown at NAB and designed for use with Pinnacle's 2100 series workstation, the DCC-21 manipulates images from two separate workstations using one control panel. Multiple layering through two live images and two still montages keyed over a background source.
Reader Service #203

OTARI Series 54 and TC-100 Consoles

These two new console designs debuted at NAB. The series 54, available in 24- to 46-input module configurations, features high-resolution meters, dual signal paths, four-band EQ, and 10 auxiliary send buses. The TC-100 Transfer Console, designed for film transfer work or video dubbing, has an input capacity ranging from nine to 18 per audio rack. It features 4 bus outputs, solo functions, headphone output, and fader bypass. For the series 54, prices start from $67,900 (32 channels/24 hi-res meter); prices are not available for the TC-100.
Reader Service #204

PANASONIC SV-3700 Pro-DAT Recorder

Unveiled at NAB, the SV-3700 features a front-panel shuttle wheel, with a speed range of 0.5 to 15 times normal. The analog input includes four-stage, one-bit Delta-Sigma A-to-D converters, while the output has proprietary Quad 18-bit DACs that reduce zero-cross distortion and enhance linearity at low signal levels, according to Panasonic. Other features: wireless remote; push-button fade-in/fade-out functions; balanced inputs and outputs through XL-type connectors (-10 dBu or +4 dBm output levels); program, absolute and time-remaining displays; and push-button choice of 44.1/48 kHz analog or digital sampling rates. Fast forward, rewind and search speeds go up to 400 times normal speed.
Reader Service #205

PANASONIC SV-3900 Pro-DAT Recorder

This new recorder, introduced at the NAB convention, offers full remote control of virtually all transport controls. The standard nine-pin serial port can be switched to ES-Bus or P-2 protocols, making it compatible with most editing controllers and automation systems. Other features include: a horizontal cassette tray; program, absolute and time-remaining displays; push-button selection of 44.1/48 kHz sampling rates in analog or digital; AES/EBU-format and S/P digital I/O ports carrying start and skip ID information within the sub-code area; and balanced inputs and outputs via XL-type connectors, with a switchable -10/+4 dBu output level. The system comes with its own remote controller, the SH-MK360, with transport controls and a shuttle wheel (speed range: 0.5x to 15x play speed). A single controller can be assigned to address any one of 32 different SV-3900 machines connected on a controller network. Price not available.
Reader Service #206

PANASONIC

ASTON Wallet Still Store Upgrade

Now marketed by Paltex International, the Aston Wallet general-purpose still store was upgraded in time for NAB. The Wallet keyboard has been extended, and Wallet now has a 105 Mb fixed disk along with a removable Winchester disk cartridge. The fixed disk stores 99 full-frame images and their associated signals; the cartridge holds 42. The Wallet is CCIR-601-ready, with image processing in RGB or YUV component specs for both image input and output.
Reader Service #207

OTARI DP-4050 E Series In-Cassette Duplicators

The "E" series, introduced at the NAB convention to replace the DP-4050, consists of the DP-4050E-C2 (one master, two slaves), the DP-4050E-Z3 (three slaves), and the DP-4050E-Z buffer unit. The cassette transports now employ a three-motor, direct-drive design, and the rewind capability on the slave transports has been upgraded. Other features: switchable master-tape end detection; short slave-tape error detection; and a microprocessor-controlled transport. The buffer also expands the maximum size of a duplication system, allowing 65 slaves instead of 29. Prices: DP-4050E-Z3, $4,495; DP-4050E-Z, $995; 4050E-C2, $5,460.
Reader Service #209

ASTON

INTERACTIVE MEDIA TECHNOLOGIES IMTX 8000 Media Integrator

This box connects to a Macintosh personal computer to allow the computer to act as a desktop hub for audio and video equipment. The self-contained system incorporates full machine control, audio/video routing, sync generation and frame-accurate SMPTE time-code indexing; it outputs in NTSC. The hardware supports parallel and serial interfaces. One IMTX 8000 can control as many as 12 picture sources and simultaneously distribute up to 20 sound sources. Five software modules are bundled with the 8000, and their capabilities include: preview edit, comp edit, creation of an EDL, and frame-by-frame animation control. The IMT serial driver, which facilitates control of up to eight machines, interprets the command set of the respective devices to and from the Macintosh, the IMTX 8000, and the media peripherals. Price: Between $7,000 and $12,000, depending on hardware configuration.
Reader Service #208

RTS SYSTEMS 2200 Transmission System

This one-way communications system features full bandwidth from a single transmitter to multiple receivers. Operating in the VHF range between 72 and 76 MHz with eight different frequencies, the 2200 system consists of a transmitter (Model 2205), belt pack receiver (2210), wire response earbud transducer (2231), and cord assembly for earbud (2232). An NAB intro, the system can be used for program feeds, behind-the-scenes intercom monitoring, and sound enhancement for the hearing-impaired. The 2205 Base Station Transmitter supports portable stations, and interconnects with the program audio source, TW Intercom, Series 800 or Series 4000 IFB system. The 2210 Belt Pack Receiver Transceiver, powered by two AA batteries for 50 hours use, drives a small earphone. Prices: 2205, $750; 2210, $92; 2231, $23; 2232, $8.50.
Reader Service #210

OPTICAL DISC 617 CX Encoder/Decoder

Displayed at NAB, this unit lets the user encode CX-standard audio into recorded videodiscs. The 617 encodes audio according to the CX standard and the IEC/LaserVision specifications for videodiscs, and decodes the audio for monitoring. The manufacturer claims the 617 improves the dynamic range of a videodisc's audio program by compressing the encoding and expanding the decoding. Noise reduction is built into the specs. When combined with ODC's 510 or 610 videodisc recording systems, the audio may be decoded and monitored directly from the disc during recording. Price: about $1,000.
Reader Service #211

RANK CINTEL Pocket Still Store

Introed at SMPTE '89 and displayed at this year's NAB, Pocket stores images in the CCIR REC 601 standard, and features a fixed 40 Mb hard disk along with a removable 44 Mb hard disk. A 16-character title can be stored with each image. Sequence length maximum is 100 images. Pocket, compatible with the Aston Wallet, is a 4RU rack-mount unit.
Reader Service #212

LEADER INSTRUMENTS 5130 NTSC Color Monitor

Introduced at NAB, this color monitor features a six-inch screen, AC/DC operation, dual video inputs and external sync drive. The monitor fills only half a rack. Price: $1,495.
Reader Service #213

FUJINON A24X16.5ERD and A16x9.5ERM Lenses

Weighing twice as much as an average ENG lens (2.9 kg), the A24x16.5ERD field zoom lens has a zoom range of 16.5 mm out to 400 mm; a minimum object distance of 1.8 m; a built-in 2X extender for a 48X zoom to 800 mm; a maximum aperture of f2.8 flat to 290 mm and F3.9 at 300 mm; macro-focusing; and a single module combining servo zoom and focus. The 1.45 kg A16x9.5ERM features an F1.8 maximum aperture remaining flat from 9.5 mm to 124 mm; F2.2 at the full 152 mm tele position; a built-in 2X extender that doubles the range to 19–304 mm; servo zoom; auto iris; manual focus; macro focusing; optional servo focus; and a minimum object distance of 0.95 m. No prices available.
Reader Service #215

FUJINON A18x8ESM CCD Lens

With a maximum aperture of F1.5 maintained out to 15X, the A18x8ESM has a built-in range extender. It weighs just 13 kg, and uses high-dispersion glass (CAFK95) to reduce lateral and longitudinal chromatic aberration. Fujinon says the design of the lens curvature eliminates ghosting, and the back surfaces of the optical elements are coated to avoid flare caused by light reflecting back from CCD chips. There is no price yet available for the NAB-introduced product.
Reader Service #214

NEW ENGLAND DIGITAL EditView and CMX Autoconform Upgrades

These software upgrades were put on the market at NAB. EditView, a graphics-based editing program, now allows the user to checkerboard cues and edit multiple cues across multiple tracks. The revised Autoconform supports a 24- and 25-frame time code, and editors can load, rehearse and retake single events, and merge updated CMX lists with alternates.
Reader Service #243

SENNHEISER WM1 Wireless Mixer

WM1 is a five-channel, portable audio mixer that operates on internal or external DC power. Four of the channels have RF receiver inputs for wireless microphones and one additional wired-balanced input for mic or line-level audio sources. Other features: bass/treble control; a switchable 70 Hz cut-off filter to reduce low-frequency rumble; pre-fader listen; and built-in test generator. Six alkaline "D" cells or NiCads provide four to five hours of operation; battery power cuts off automatically when external power is plugged into the jack. Price: $25,500.
Reader Service #216

CHANNELMATIC PCU-1A Programmable Clock Unit

Introduced at NAB, the PCU-1A has programmable sequencing to allow the operator to schedule and view the daily events in the order in which they will run. An automatic schedule-template generator lets the user create two weeks of schedules. When used with optional software, the PCU can create macro schedule events, which activate eight control outputs from one event command. Up to 3,000 events can be loaded into the PCU-1A, which can be expanded to control up to 1,000 outputs through use of the BDD-3010A modules. The one-rack unit package lists at $2,350; Software for the programmable clock unit is priced at $950.

Reader Service #217

DIGITAL PROCESSING SYSTEMS DPS-265 Four-Field Frame Synchronizer

This unit, new at NAB, features a four-field memory and a built-in TBC with automatic mode switching. This full-bandwidth unit has a digitally controlled proc amp with 10 non-volatile memories and front-panel switching of its three inputs. A built-in test generator with dedicated output provides four test signals. Other features: variable strobe; comb filter; VITS/VIRS insertion; AGC; switchable black and white clippers; SMPTE ES bus compatible remote control; RS232 port for interface to PC; GPI input for freeze control; H and V system phase adjustments; and hot switch. Price: $5,495.

Reader Service #218

DIGITAL PROCESSING SYSTEMS DPS-245 Quad Framestore

This new quad DPS-245 framestore, with a single loop-through video input and four video outputs, has its own internal four-field memory and independent freeze capability. The preview output channel can also be routed back to the input, so that a frozen image can be adjusted. By attaching a color black signal to its reference video input, the DPS-245 can be used as a synchronizer. Other features for this NAB newcomer: four RS-170A outputs; digital proc amp with 10 non-volatile memories; RS232 and RS422 remote control capability. Price: $6,495.

Reader Service #220

ACCOM

ACCOM DIS 422 Digital Image Store

The DIS 422, introduced at NAB, stores images in 4:2:2 form, and has CCIR 601 (D-1) input and output. It operates in 525-line and 625-line rate standards, and switching between standards is automatic. The basic unit stores 100 stills, but optional drives can be added to expand storage to 600 stills. An optional drive with removable media can also be added for image transfer, backup and archiving. Wipes and windows allow visual comparison between live, grabbed and stored images. Prices start at $19,500.

Reader Service #219

SONY VPH-1270Q Video Projector

The SuperData MultiScan video projector, compatible with most computer sync signals, offers a 120-inch preset screen size that can vary from 67 to 250 inches. Remote-controlled, the unit has a non-synchronized high-voltage circuit which Sony says eliminates picture zooming (the change in a projector's picture size when a high horizontal sync frequency is input into the system). The peak white light output is 650 lumens, and full-screen white-field brightness is 200 lumens. Resolution provided by the RGB input is more than 1,250 lines and 1,110 x 970 pixels (measured at fH: 40 kHz and fV: 38 kHz). Composite video input resolution: 650 TV lines. Price: $15,990.

Reader Service #221

SHURE BROTHERS L2 Handheld Transmitter

This transmitter is available in three different versions: the L2/58, featuring SM58 dynamic microphone ele-

ment (price: diversity version, $666; non-diversity, $532); the L2/96, incorporating the condenser element used in Shure's SM96 condenser mic (price: diversity, $707; non-diversity, $572.50); and the L2/Beta 58 (price: diversity, $748.50; non-diversity, $613.50). Because of their dual-trace, gold-plated wiper contacts, the transmitter heads are interchangeable without the need to solder or unplug wires. To avoid sounds created by hand movements or wireless transmitters, the L2 features an internal-loop antenna design. The unit—which also has double-tuned RF output stages, a low-distortion modulated oscillator, "mirror-image" companding, and a concealed audio gain adjustment switch—can operate 12 hours on a standard nine-volt alkaline battery. A lithium battery may be used if even longer operating time is needed.

Reader Service #222

SONY DNS-1000 Digital Network Still Store

Specifically designed for the broadcast market, the DNS-1000 includes multi-user interfacing through a distributed-hardware, networked-software design. The still-store unit features drives for a transportable WORM (write once, read many) disk that stores 1,800 images, along with a 5¼-inch rewritable optical disk that can store 500 images. A mouse and menu or the control panel provide access to the DNS-1000, which stores images in the CCIR-601 4:2:2 component digital format. Options include a RAM disk, and a size-and-position module that allows compression of images. Announced at NAB, the DNS-1000 will be ready for delivery in late 1990.

Reader Service #223

MCG ELECTRONICS DLP-4.3 Secondary Protector

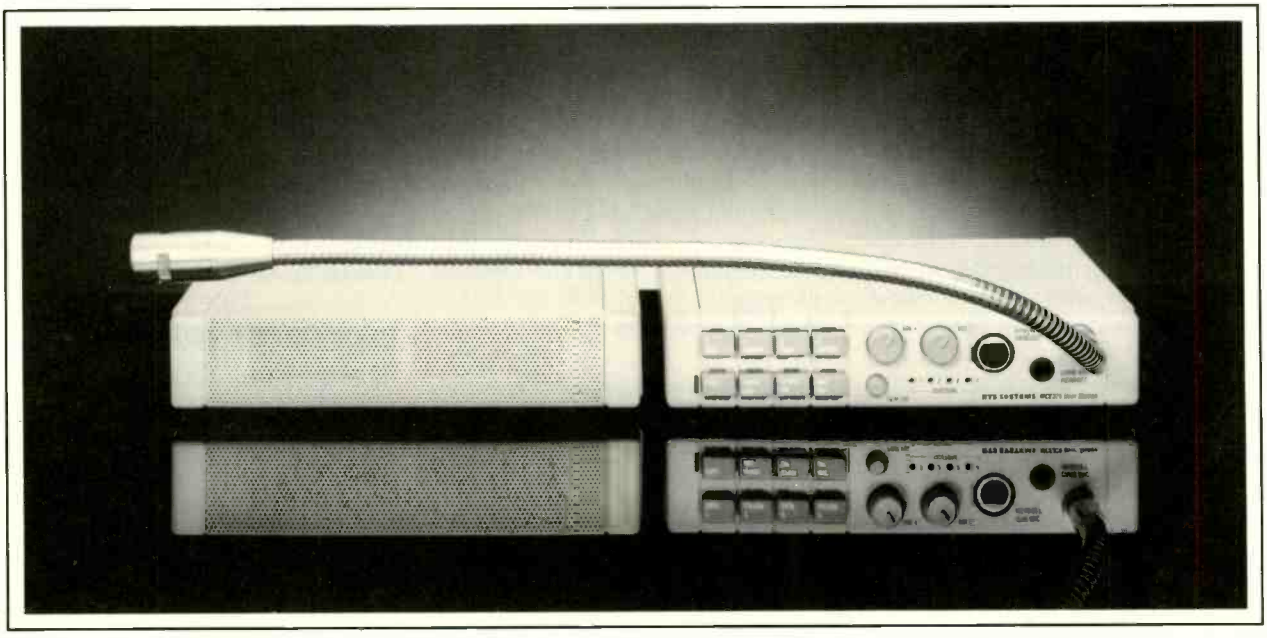
Reacting in less than a nanosecond, the DLP-4.3 handles transient current greater than 180 A on an 8 x 20 μs waveform, and greater than 40 A on a 10 x 1,000 μs waveform. The unit, which incorporates Avalanche diodes and brute-force gas tubes as part of its protective features, has been designed to withstand lightning, transients and surges occurring on dial-up telephone lines. Fax machines and modems can be plugged directly into the DLP's RJ11 jacks, and the unit itself plugs into an AC outlet (with adapter if needed). Priced from $49.50.

Reader Service #224

RTS SYSTEMS MCE325 Programmable User Station

Designed to work as a TW intercom system user station, the MCE325 can be used in conference-line or dedicated-line environments, with two-channel split talk/listen or four-channel combo talk/listen, in two-wire or four-wire line modes, or in a combination of two and four. Unveiled at NAB, the MCE325 is a user-programmable system that can be utilized in any of the following arrangements: rack mount or portable headset station; rack mount or portable speaker station (with the MCS325 modular speaker); and console mount headset station. Other features: a centrally-generated talk-off signal to shut down mics; call signaling; and two program inputs. Price: $805.

Reader Service #225



RTS

ELMO

ELMO MANUFACTURING SSC-8C Color Quad Monitor System

Designed primarily for security applications, such as monitoring transmitter rooms or TV studios, this two-page color quad system uses one screen to accept up to eight one-inch CCD color or black and white video cameras. The monitor can automatically alternate between pages, or be manually operated to display individual quad screens or cameras. The system has a second video output so that a second monitor can be added for continuous display of one quad screen or one page. Each camera can be positioned up to 1,640 feet away from the controller, and only one copper coaxial cable is needed. The controller price is $1,800. Elmo also offers two dedicated half-inch CCD cameras: the Elmo SN 303 for $1,084 and the SE 303 black and white for $685.

Reader Service #226

QUANTEL Harriet Graphics Workstation

Demonstrated at NAB, Harriet integrates Paintbox with a random-access picture store (Carousel) and with video effects and VTR control. Capabilities include painting, retouching, rotoscoping, perspective, stencil work, multi-layering, cel and frame animation, and custom wipes and dissolves.

Reader Service #227

NOVA SYSTEMS NOVASync Frame Synchronizer

The eight-bit, 4x subcarrier sampling NOVASync 2 features a TBC with a VTR-SC direct mode, S-VHS input processing, and universal Heterodyne processing. By detecting input stability, the system can automatically select the Synchronize or TBC mode, providing flexibility for any number of feeds. NOVASync F adds Freeze Frame, Field 1 or Field 2 capabilities to the NOVASync. NOVASync 2F combines the Frame Sync with AGC, TBC and Freeze into a one rack-unit package.

Reader Service #228

DYNAIR ELECTRONICS D-2 Digital Switching Technology

Demonstrated at NAB, Dynair's new digital switching and distribution system employs Bipolar AMI-B3ZS coding. According to the company, this coding eliminates system tilts, lessens cascaded genlocks and clamps, and allows easy setup and maintenance.

Reader Service #229

RTS SYSTEMS MRT327 User Station

A NAB intro, this two-channel intercom station is designed as a TW Intercom System component, featuring call-signaling, two-channel selection, and remote talk-off (a 24 kHz tone superimposed on the audio signal) for shutting down all user-station mics on the line. The MRT327's modular packaging technique lets it be arranged in a rack mount, a portable headset station, a portable speaker station (including the MCS325 modular speaker), or a console mount headset station. No price available.

Reader Service #230

PMI SSM-2141 Audio Line Receiver

The SSM-2141, a high common-mode rejection differential audio line receiver, was designed to provide a self-contained differential stage for low-impedance cable runs in high-performance audio systems. Primarily employed for power amplifiers, mix consoles and tape recorders, the unit can also be used as an instrumentation amplifier. The 2141 typically achieves 100 dB of common mode rejection. Other specifications: distortion of 0.002 percent over the full bandwidth, 9.5V/μS slew rate, and three MHz bandwidth. In 100-piece quantities, the SSM-2141 costs $1.95 apiece.

Reader Service #231

ANRITSU MD6401A Data Transmission Analyzer

This equipment, which handles transmission rates from 50 b/s to 10 Mb/s, incorporates any of five different data interfaces to generate the codes needed for data transmission analysis. It displays a range of test parameters simultaneously, including error count and rate, ES and percent ES,

DM and percent DM, and SES and percent SES. The analyzer produces programmable data patterns and analyzes virtually all transmission formats. Many functions can be controlled by a single button, says the company, and hard-copy documentation is available through the system's built-in thermal printer. Cost: $7,995; optional plug-in interfaces range from $705 to $2,530.
Reader Service #232

SONY LVA-7000 CRV Disc Player

This Component Recording Video (CRV) disc player will replay any system-compatible optical disc. Key features include: high-speed search (access to any frame in 0.5 second), a frame memory which does away with screen blanking during search, and field- or frame-mode playback which eliminates slow-motion/still-image jitter. The player can be interfaced to other editing systems through the provided RS-422 and RS-232C ports. Price: $9,995.
Reader Service #233

SONY VPH-1031Q Videographic Projector

This MultiScan videographic projector can be used with 60- to 250-inch screens, and it accepts TTL and analog RGB inputs. Resolution is 1,100 TV lines (RGB) and 650 TV lines (video input). The unit offers varying scan rates: from 15 kHz to 36 kHz (fH) and 40 Hz to 150 Hz (fV). Through external interfaces, it can accommodate connections to most personal computers, including IBM PCs with MDA, CGA, EGA, VGA and PGA boards. Price: $8,575 (projector only).
Reader Service #234

SONY VPH-1042Q Video Projector

The SuperBright projector is designed with a new HACC/HD-6 hybrid lens which Sony reports has the same resolution specs as glass lenses, maintaining clarity and high contrast across the screen. The lens also has separate adjustments for center and corner focus. Projecting images from 70 to 250 inches at 600 lumens, the VPH-1042Q has a 1,000-line RGB input, a 650-line composite video input, and can connect with composite NTSC, SECAM and PAL systems. It is equipped with an S-video input through a four-pin DIN connector, which allows for separate Y (luminance) or C (chromanance) input. Price: $8,594 (projector only).
Reader Service #235

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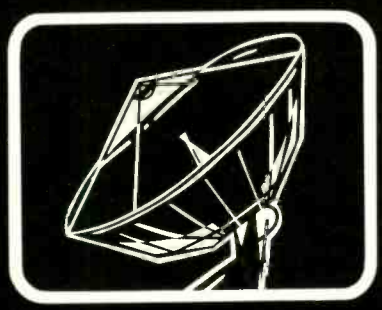

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LETRASET Studio Line CD Software

In CD ROM format, Studio Line CD provides an integrated suite of graphics packages on a single disk. Packages include: DesignStudio for page design; ColorStudio for 24-bit image-making; ImageStudio for composition; LetraStudio for type design; and FontStudio for creating fonts and logos. Price: $3,500.

Reader Service #236

PALTEX IMAGING SYSTEMS DYAD^2 Digital Mixer-Keyer

Designed to bridge the gap between D-2 DVTRs and analog edit suites, the NAB newcomer DYAD^2 performs linear keys; mix to keys; or mixes while in a digital environment. The system, employing a single trackball control, features analog and digital inputs for foreground and key, with system status displayed either through a TTL-level computer monitor or an overlay on an existing composite video monitor. NTSC Price: $20,000.

Reader Service #237

ZAXCOM ZX400 Time-Base Corrector Control System

This four-TBC/D-2 control system, which controls any type of TBC or D-2 VTR, features EDL storage; GVG E-MEM storage; optional auxiliary control panel; freeze control; 99 tape and two timing memories per TBC; TBC transition; and auto color-framing for a Sony one-inch. The ZX400 mounts on the edit console.

Reader Service #238

PANASONIC WV-D5100 Component Video Camera System

With more than 480 lines of horizontal resolution, the WV-D5100 has a high-speed electronic shutter (up to 1/2000 speed), an auto focus zoom, power zoom, and an auto iris, among other features. The unit's RGB color temperature sensor detects changes in light source and intensity and color temperature. Microcomputer control automatically adjusts color balance. The company claims the WV-D5100 S-VHS compatible video system produces precise, well-defined images in seven-lux lighting conditions. The suggested retail price is $1,500.

Reader Service #239

LEADER INSTRUMENTS EFP/ENG 5864A Dual-Input Waveform Monitor

Designed for use with Leader's Vectorscope 5854 and SID Signal Generator LCG-413, the battery-powered 5864A provides two H/two V MAG and two H/two V sweep rates. The unit, which weighs less than three pounds, also offers flat and IRE filters and a 4x vertical magnifier designed to simplify setup level and black-balance checks. Price: $1,395.

Reader Service #240

FUJINON A4x7.5MD/A8X12MD CCD Zoom Lenses

Touted as "graphics" lenses in their NAB introduction, the A4x7.5MD and A8x12MD were designed for the optical demands of the higher pixel count CCD cameras. Fujinon says such lenses are necessary because CCD cameras do not have the adjustment range of tubes. The A4c7.5MD has an MOD (minimum object distance) of 0.45 m and an F2.8 maximum aperture from 7.5 mm to 30 mm. The A8x12MD is an F2.8, with no dropoff from 12 mm to 96 mm. Iris control is automatic or can be remote-controlled by equipping the lens with Fujinon's MD servo zoom and focus modules. The company claims the lenses offer higher resolution—"particularly in the corners"—than previous lenses used for CCD cameras.

Reader Service #242

CONVERGENCE ECS-185 and ECS-985 Edit Controllers

Joystick editing, a tradition at Convergence, continues with these NAB introductions. The ECS-185 edit controller, controlling RS-422 serial VTRs in ½-inch, ¾-inch, and one-inch formats, offers 500-line, non-volatile EDL memory, advanced convergence list-management software; auto assembly; and the option to field-upgrade to A/B roll editing with a RS-422 serial switcher interface. It is available in two- and three-VTR configurations. The ECS-985 includes four or six VTR interfaces; serial switcher interface with switcher effects memory capture capability; and three-keystroke VTR assignment.

Reader Service #241

CONVERGENCE

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Fade to Black: Old-Boy Hiring Network

By Tim McCartney

Broadcast station managers and others with hiring authority are truly on the spot when conducting job interviews or designing job application forms. Not only is it essential that a qualified candidate be hired, it is equally important that appropriate questions be posed. Some serious problems can result when the wrong question is asked of the wrong person.

Too often, managers rely on the "old-boy" hiring network as standard operating procedure: They hire candidates who went to the same school they went to, or who have the same friends they have. If these options are not open, the old-boy managers tend to make gut-level hiring decisions. This kind of shooting from the hip ignores today's hiring environment, where legal problems may surface.

It may be tempting to be fully confident that legal counsel can resolve such problems. The feeling persists widely in many professions, including broadcasting, that management is infallible on hiring. Yet lawyer fees of $100–$225 per hour can easily add up to thousands of dollars in defense of legal charges.

One of the stranger circumstances in many bottom-line-oriented industries is that legal fees rest on a higher pedestal within budgets, somehow aloof from management's otherwise frugal posture. The contrast is striking and inexplicable: The manager searches endlessly to save nickels and dimes from every line item, but then routinely dismisses enormous legal bills as a cost of doing business.

Besides the legal costs it may face, a station that makes inappropriate inquiries also unleashes disgruntled applicants who can inflict damage on the station's public relations and advertising objectives. Therefore, it makes sense to design application forms and prepare interviews which follow appropriate and lawful procedures.

To help guide you, here are some unlawful and/or inappropriate categories for job applicants: age, arrests, child-care arrangements, citizenship, credit record, garnishment records, marital status, national origin, number and ages of children, physical characteristics, property ownership, race, religion, sex and spouse's background.

In the age category, for example, are you aware that federal law protects Americans against age discrimination between ages 40–65? Such knowledge should help you avoid asking any type of question designed to uncover a candidate's age, unless there is some very justifiable reason.

This list should be used to review your station's job application form. Categories that do not become obvious upon meeting the person should be areas of caution when interviewing.

In addition to helping avoid legal costs and ill will, the list also serves to guide you away from intangible concerns and toward matters of relevance. After all, it is the manager's job to hire the best candidate.

A thorough review of topics related to appropriate hiring is available in the NAB publication "A Broadcaster's EEO Handbook." Among many other topics, the 1989 second edition explores equal employment opportunity principles and the FCC's interests. While old-boy practices may not yet be completely dead, they have been dealt a fatal blow by federal and state legal actions. Unlawful inquiries—or even inappropriate ones—could trigger legal battles.

With examples of poor hiring decisions displayed everywhere, it is now time to do your part. Hammer the final nail into the coffin for archaic old-boy hiring practices, and fade the network to black. ■

Tim McCartney heads McCartney Radio Engineering Co. in Bemidji, MN.

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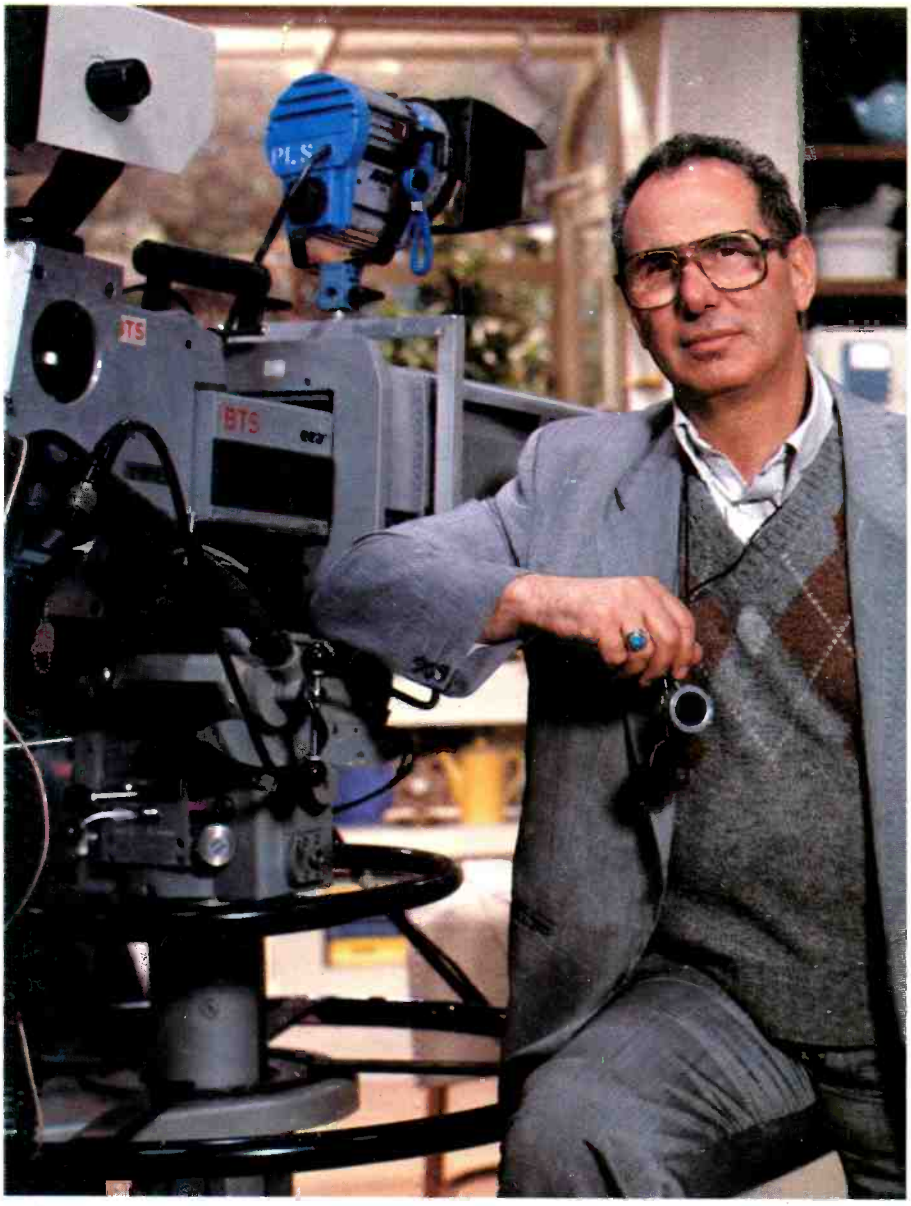

Name: George Spiro Dibie

Profession: Supervising Director of Multicamera Photography for Warner Brothers Television.

Current Credits:
Growing Pains
Just The Ten Of Us

Organizations:
President, International Photographers Guild, Local 659, Hollywood; member, Directors Guild of America (DGA); member, Society of Motion Picture and Television Engineers (SMPTE). TV Academy, A.S.L.D. and S.O.C.

Awards:
Winner of three Emmys.

George Spiro Dibie on Production Lighting:
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George Spiro Dibie on BTS LDK-90 cameras...

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