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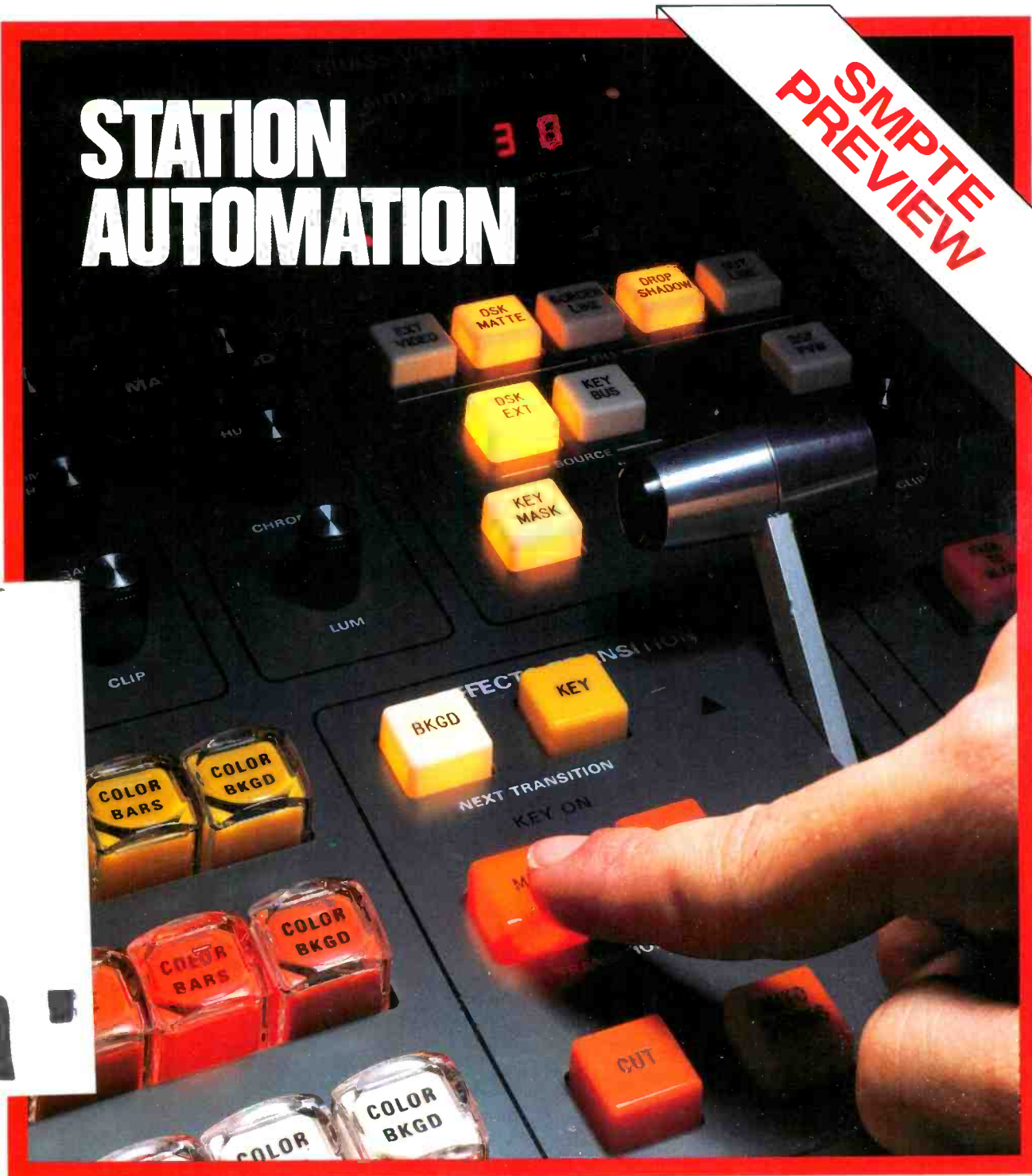
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 295 Madison Ave., New York, N.Y. 10017
 212-685-5320, Telex: 64-4001
 Publishers of:
BM/E—Broadcast Management/Engineering
BM/E's World Broadcast News

ABP
V BPA

BM/E BROADCAST MANAGEMENT ENGINEERING (ISSN 0005-3201) is published monthly by Broadband Information Services Inc. BM/E is circulated without charge to those responsible for station operation and for specifying and authorizing the purchase of equipment used in broadcast facilities in the U.S. and Canada. These facilities include AM, FM and TV broadcast stations, CATV systems, ETV stations, networks and studios, audio and video recording studios, telecine facilities, consultants, etc. Subscription prices to others \$24.00 one year, \$36.00 two years. Foreign \$36.00 one year, \$60.00 two years. Air Mail rates on request. Copyright 1985 by Broadband Information Services, Inc., New York City. Second class postage paid N.Y., N.Y. and additional mailing offices.
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I. Jay Azimzadeh, President
Video-Pac Systems, Ltd.
Hollywood, CA

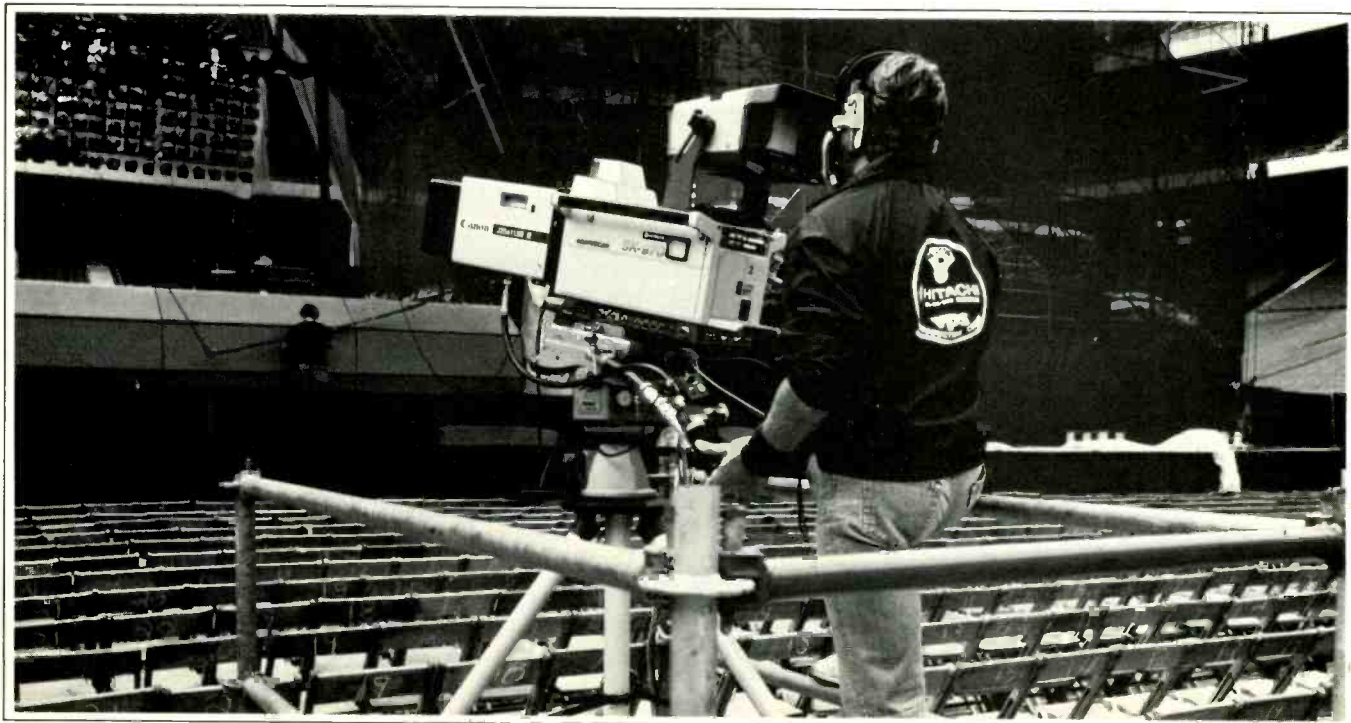
The largest producer of live concert videos in the U.S., VPS requires lightweight, low-maintenance broadcast cameras it can put on the road for long stretches.

Azimzadeh considers the SK-970 the only studio camera with 2/3-inch mobility and EFP handling. So it can meet the demands of often makeshift stadium facilities, while delivering the broadcast images that are needed for larger-screen multiple projection.

Since each of the four SK-970s and two SK-97s in the

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

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



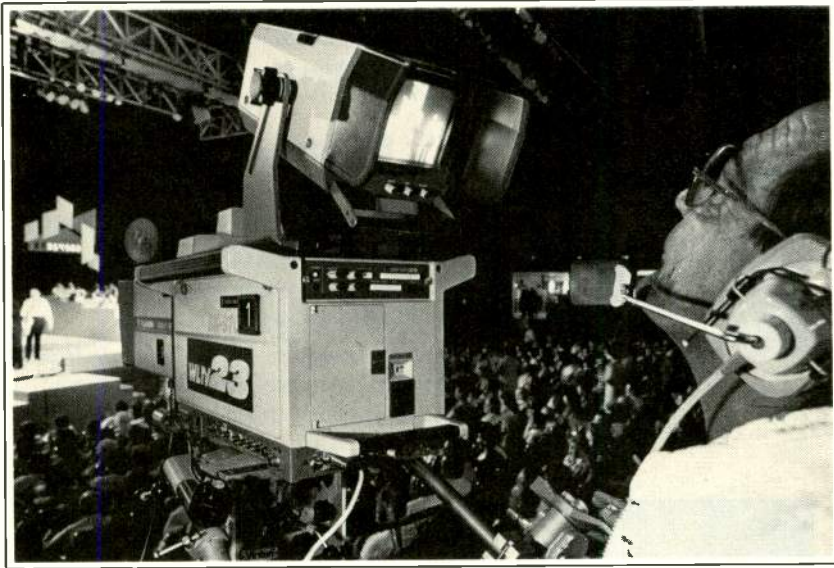
"Since each SK-97 and SK-970 has its own on-board computer, I can set everything up at the same time automatically."

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

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

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

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



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

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

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

Bill Weber
Vice President for Engineering
WHYY Television
Philadelphia, PA

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

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

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

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



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

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

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BROADCAST MANAGEMENT/ENGINEERING

OCTOBER 1985

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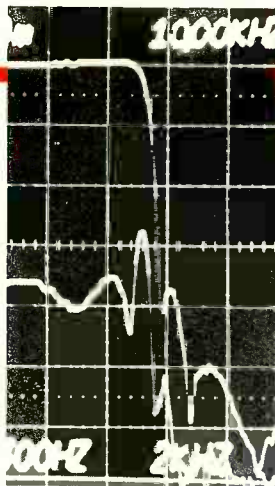
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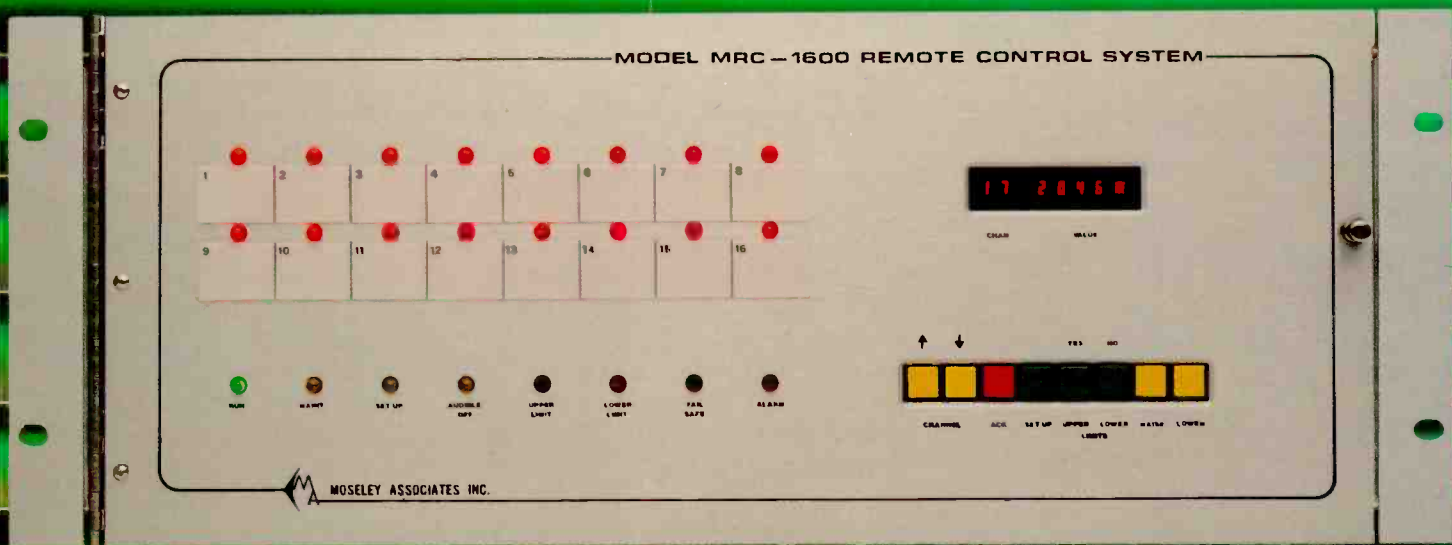
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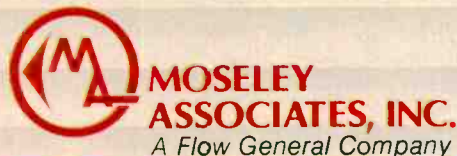
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Mediator, Not Dictator

(Ed. Note: This guest editorial is in response to BM/E's March editorial, "Bravo Mr. Barnathan," concerning the SMPTE Quarter-Inch Working Group.)

In any disagreement, the most likely means of resolving the issue and bringing about agreement or compromise is through an arbitration process whereby a mediator brings the dissenting factions together in an impartial forum.

Although most standards issues have been quietly resolved in an air of cooperation, the Society of Motion Picture and Television Engineers, when necessary, has been such a mediator during the over 30 years that it has been helping to bring about international standards. Recent comments concerning the 1/4-inch videotape standard indicate a basic misunderstanding of the SMPTE's function in the standardization process. The role of the SMPTE is that of mediator, not dictator. Simply put, it "can lead the horse to water, but it can't make him drink."

Ultimately it is the end users, not the SMPTE, who have the power to exert pressure upon the dissenting parties, and the press can help voice that pressure. In fact, long before the debate intensifies, it is the press that can set the stage, and at the pinnacle of dissent, it is the press that can urge resolution of the conflicting positions. Therefore, the involvement of the press is not only welcome, it is to be encouraged.

The recent controversy about the ongoing standardization process for 1/4-inch videotape has been sparked by the accusation: "Why hasn't the SMPTE acted?" The question implies ignorance of the process. It must be restated that it is not the function of the SMPTE to place a standard on the table, but rather to provide the framework for rational discussion to take place. If the participants failed to achieve a standard, it may be a matter for regret, but the SMPTE cannot and should not be held accountable for such inaction.

The SMPTE will continue to bring about standards, whether a particular challenge ends in success or otherwise, because the SMPTE's purpose is to provide a forum where there exists a chance for consensus. The SMPTE believes, as did Horace Mann, that "the word, even the most contradictory word, preserves contact—it is silence which isolates." The purpose of the SMPTE is to ensure that contact.



Richard G. Streeter
Vice President, Engineering
SMPTE



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A slate tone can be laid

down on the tape for locating specific takes, and there's also a built-in mic for voice slating.

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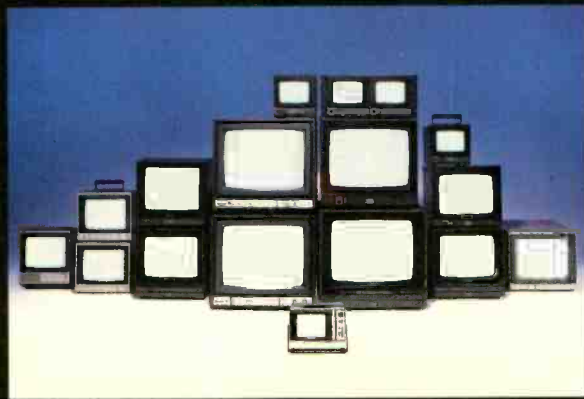


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models with a built-in tuner, NTSC composite and RGB inputs for use with computer graphics. And when light weight and portability are important, there's the CT Series 5" monitor receiver.

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Comsat Offers Ku-band Service

Another company has joined the fast growing fleet of companies offering mobile satellite services. As of the RTNDA show last month, Comsat General Corp. in Washington, DC, a subsidiary of Comsat, is offering broadcasters a turnkey Ku system including a new transportable uplink.

Named SkyBridge, the system includes a 2.4-meter dish mounted on a 19-foot truck with an official setup time of five minutes. Two redundant high-power amps, video receiver and test equipment are rack-mounted for customization. The truck can be bought or leased as part of the package along with satellite time and a downlink.

Comsat General designed and built end-to-end NBC's Ku distribution system, which includes larger mobile uplinks. A company spokesman said before RTNDA that the first Skybridge buyer had already been lined up.

Setup is Problem for Component Systems

SMPTE is looking for a way to possibly eliminate setup in NTSC systems in combined component/composite facilities as a way of assisting NTSC/component transfer. Component systems being set up by SMPTE do not use setup, so such transfers are complicated by addition or deletion of setup and the decrease or increase of the level, but mostly in decoding because of inaccuracies in the setup level.

The two SMPTE Working Groups that are working on standards for component television, the Digital Video Standards and the Component Analog Video Standards Groups, are reportedly looking into the matter "on an urgent basis."

"It makes no difference whether the component systems are analog or digital," Stan Baron, the chairman of the Digital Video Standards Group, has said. "The removal or addition of setup will be a significant source of error wherever translation between

A Dish for Bowls and Other Events



Starshooter is designed to be operational 15 minutes after arriving.

The "finest C-band transportable uplink on the road" is how Capitol Satellite, a subsidiary of group owner Capitol Broadcasting Co. of Raleigh, NC, and Raycom, an independent college sports syndicator operating out of Charlotte, are describing their new Starshooter vehicle. The 45-foot trailer boasts a 4.5-meter Andrew antenna with construction

sturdy enough to allow it to stay in business in winds over 80 mph.

Starshooter is scheduled to roam the midwest and southeast this year for Raycom's coverage of Big Eight and other football and basketball conferences and bowls. Capitol Satellite provides other C- and Ku-band services through its North Carolina Teleport.

the NTSC environment and the component environment takes place."

Merrill Weiss, who heads the Component Analog Group (see SMPTE report in this issue), said that "Having no setup in NTSC makes it possible to keep black levels constant without operator intervention. In addition, there is an improvement of approximately 3/4 dB in signal-to-noise ratio or dynamic range achievable by eliminating setup. It would only be necessary to add setup on the output of a facility when required for transmission or interchange."

An ad hoc group at SMPTE studying component studio implementation will investigate elimination of setup and will seek input from the industry on this issue.

New Telerecording Method for Audio

It is now possible to digitally record high-quality audio through a switched telephone line onto a floppy disk.

CompuSonics made audio history recently when the company sponsored a telerecording demonstration along with AT&T, which provides the high-speed lines.

Live audio of WLS radio was sent from Chicago to a CompuSonics DSP-2002 via AT&T's Accunet Switched 56 and recorded onto floppy disk. Later, recorded stereo music was also sent over the phone lines and played back from a floppy disk with no noticeable degradation.

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NEWS

The Accunet Switched 56 service is a dialable 56 kb digital line similar to dedicated private lines which used to be employed for digital transmission. Because it's a switched service, however, it can be dialed up as needed at a much lower cost, less than \$50 per hour of usage, according to AT&T.

The CompuSonics DATS (digital audio transmission system) consists of the company's DSP-2002 audio computer, which CompuSonics has been aiming at the audio recording industry, equipped with an optional interface cir-

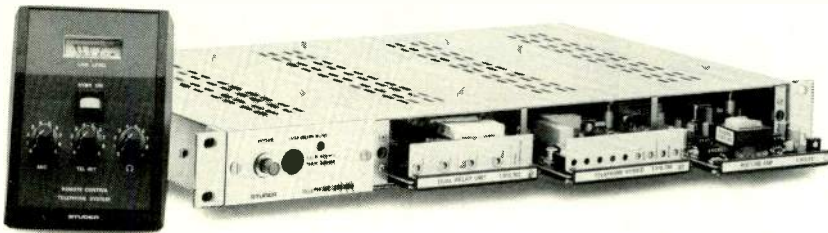
cuit board and software for high-speed digital transmission of audio signals. Also used in the demonstration was software featuring the company's CSX digital audio encoding, a telephone interface unit, and California Microwave Flextie unit.

According to David Schwartz, president of CompuSonics, the actual transmission time for a specific recording depends on the CSX rate selected. A stereo recording with a CSX factor of eight, for example, can be sent over the Accunet Switched 56 service in a peri-



CompuSonics president David Schwartz listens as the company makes audio history by recording live audio digitally over switched telephone service onto floppy disk using the company's DSP-2002.

Standard Setter



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od four times the actual running time. A 15-minute recording will take one hour. Schwartz said at the time of the demonstration that CSX 16 was under development, and that it would have the capability to record audio at 6 kHz in real time.

Schwartz said that beta tests of the telerecording system have started in New York City and Washington, DC. He says a major radio network, which he declined to name, is recording news actualities over phone lines for broadcast.

However, Schwartz envisions much farther-reaching applications for the digital audio telecommunications system. He mentioned the possibility of sending high-quality audio for radio spots from the west coast to the east in hours, instead of the days it would take to arrive by mailed tapes. And he even visualizes a time when new music will be sent out from recording companies directly to radio stations or consumers at home, from the phone onto floppy disk, without the need for tapes or vinyl recordings. If that happens, it would be good news for CompuSonics, which not only has a floppy disk-based digital recorder for broadcast use on the market, but has been trying to break into the consumer marketplace with its floppy disk-based DSP-1000.

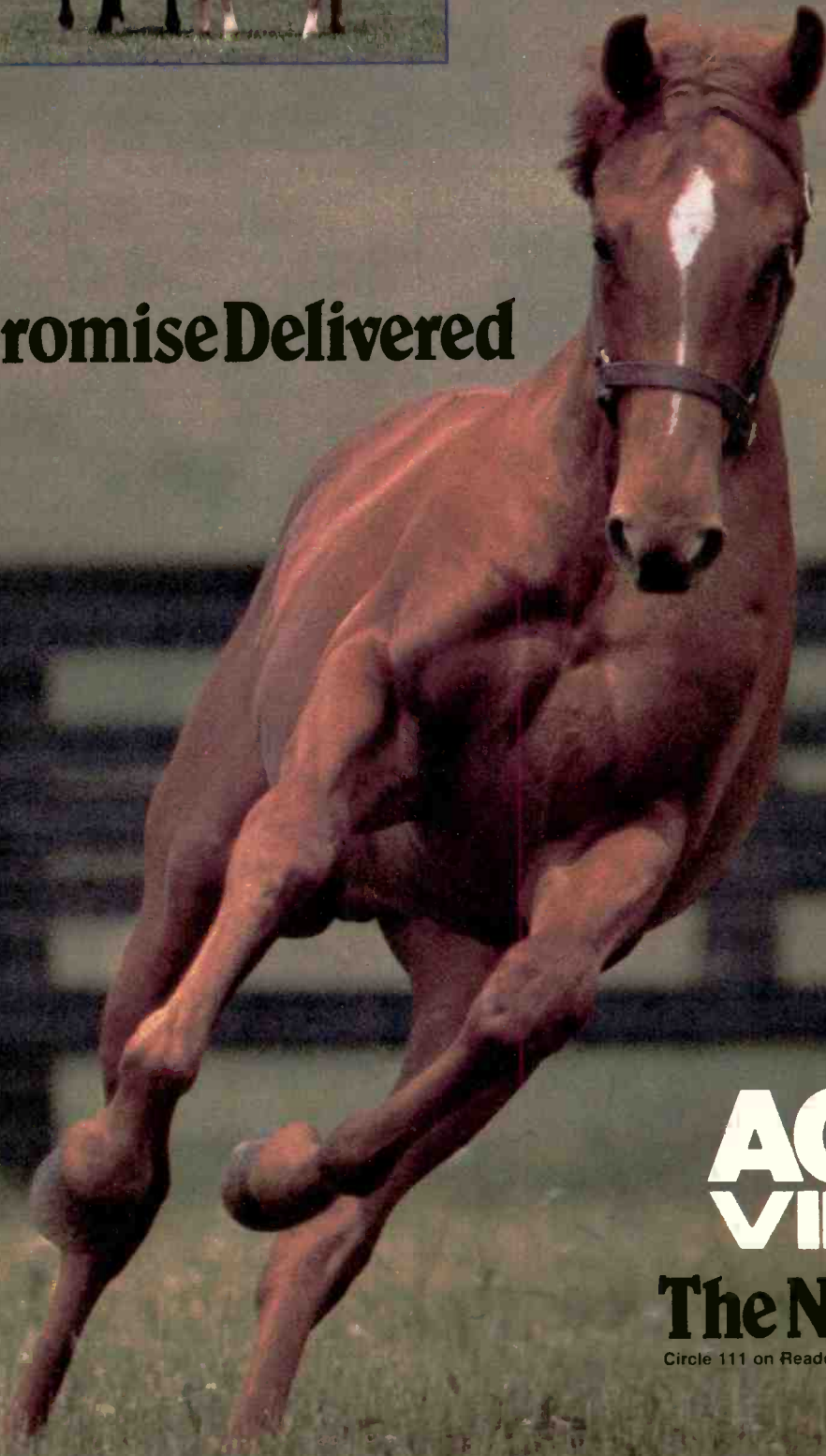
New Weather Network Goes on Satellite

A new weather network is being started this fall by Environmental Satellite Data of Suitland, MD and Wold Communications. Named WINX, it will distribute weather



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NEWS

graphics and information via satellite and also serve as a mail system for Wold's satellite program distribution.

The WINX weather network will consist of weather graphics and information transmitted by Wold on Telstar 301 and downloaded at stations into ESD's Front End data processor, which is based on an IBM XT or AT personal computer, or its Color Connection graphics and production system. The Front End computer collects and sorts data and images and then passes them on to

any of several different graphics systems. When electronic mail software is added later this year, message and scheduling information from Wold to the approximately 650 television stations it feeds each week will pass automatically to another terminal in each station.

The weather service itself will be arranged in three tiers, consisting of ESD's basic service, basic plus Domestic Data Circuit, and those two plus Metplan or NAFAX and DIFAX. Metplan is the weather chart service

designed by Lockheed Data. The cost per month, which is a flat rate, will be \$950, \$1025, and \$1200, respectively.

Kodak Honors Emmy Nominees

In a move clearly aimed at making further inroads into the video industry, the Eastman Kodak Company recently gave out awards of its own to five news and documentary Emmy nominees named for their achievements in film and video photography.

Among the five nominees were two cinematographers and what Kodak is calling "an electronic photographer"—or videographer—who went on to win Emmies in the news and documentary category.

The Emmy winners were Martin Bell and Hugo Van Lawick for cinematography on *Among the Wild Chimpanzees*, a National Geographic special produced by public station WQED in Pittsburgh. The program was 22 years in the making. For electronic photography the winner was Jon Alpert for *American Survival 1984* for NBC's *Today* show.

The other nominees honored by Kodak were Jeffrey Rathner, for a segment on *The MacNeil-Lehrer News Hour*, and Keith Kulin for a segment on CBS's *Sunday Morning*. Emmy winner Bell was also nominated for a Smithsonian World production aired on PBS.

The National Academy of Television Arts and Sciences also gave three Emmies for engineering developments.

RCA Corp. was honored for the development of its solid-state imaging pickup device, used in the innovation of its CCD camera.

Sony Corp. and ABC each received an Emmy for their respective contributions to the development of the Super Motion System (Super Slo-Mo)—Sony for the technology and ABC for the concept.

Two States Enact AM Stereo Warnings

Although the battle over the two remaining AM stereo systems has been waged long and hard and Motorola is enjoying the largest number of converts, most consumers remain in the dark or confused about AM stereo transmission. Now, at the urging of

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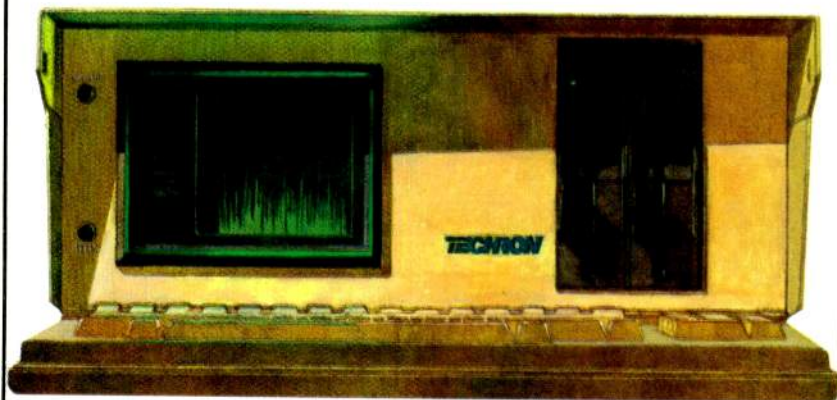
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Leonard Kahn, developer and marketer of Motorola's competition—the Kahn system—the consumer offices of two states have taken steps to warn buyers of AM stereo radios that they may not be able to receive every AM stereo station in full stereo fidelity.

After some public discussion, the state of Connecticut has paved the way by proposing a regulation making it "deceptive" for any AM stereo radio dealer, including those sold in cars, to sell radios without

disclosing which systems the receiver is capable of receiving. Dealers would be required by state law to state the systems by name and if only one system can be received, as in the case of Motorola C-Quam-only receivers now being marketed by major car companies and radio manufacturers, the dealer must use the word "only" preceding the name of the system. The disclosure is also required by labeling on the product, and in all advertising and brochures.

The state of Utah's division of con-

sumer protection has taken steps of its own, issuing a "consumer alert" which informs the public about the competing systems and receivers not receiving all AM stereo stations in full stereo. It also urges consumers to wait for "universal" AM stereo receivers (currently marketed by Sony) to appear on the market.

Frank Hilbert, manager of AM Stereo for Motorola, says the company is in favor of a consumer alert, but thinks out and out regulation is unnecessary.

"As far as we know, the consumer who is buying an AM stereo receiver is pretty well informed," says Hilbert. "We do think it's good that dealers have to identify C-Quam radios, however."

Hilbert says the receiver manufacturers are waiting to see if the changes recommended by the Connecticut consumer office actually become law before reacting to what is involved in labeling and advertising disclosure.

Although both the EIA and Motorola filed objections to the proposed law, Hilbert does not believe the state's actions will help promote the Kahn system or help foster the marketing of multisystem receivers.

"I think it will underscore the fact that there are almost no multisystem receivers," Hilbert maintains, adding, "I think consumers will still pick C-Quam receivers, because it's the de facto standard."

Some 230 AM stations were broadcasting C-Quam stereo as of August, and 32 manufacturers were producing C-Quam-only radios, with Radio Shack the last jump into the Motorola corner.

Local News Gets Two More Sources

Local stations are getting two new sources for news from outside their own turf. One is V.I.P. Newsmaker Interviews, a live interview show from The Visnews Group via satellite, which will allow stations to ask questions of national and international figures. The other is Conus Washington Direct, created by Conus Communications, which will deliver live, unedited Washington coverage, especially events of local import, over Ku-band satellite.

V.I.P. Interviews, due to begin late this fall, will be regularly scheduled

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weekly interviews during which broadcasters can ask questions by telephone. Delivery will be by satellite, mostly on Westar 4 and Telstar 301. The service will be sold on a market exclusive basis with prices expected to range between \$150 to \$800 per week based on market size. Sample feeds were run in August and September with Israeli prime minister Shimon Peres scheduled for the last installment.

Conus Washington Direct from Conus Communications of Minneapolis is intended to offer stations unedited, live

coverage of all White House press activities and other White House and Washington events with possible local significance. Conus Communications plans to deliver the service, which is scheduled to begin in early September, with the Conus Ku-band transponder during this fall and then in the winter switch to the new RCA Ku-band satellite. Another Hubbard Broadcasting company, USSB, has arranged for RCA Americom to give stations Ku dishes (see *BM/E*, June 1985, News section).

Source Update

Please make the following additions to the Alphabetical Listing of Manufacturers and Instant Source Locator in your copy of The Source Buyer's Guide, BM/E, August 1985:

DELMARK CORP. ✓
1092 N. Tustin Ave., Anaheim, CA 92807
714 666-2790
Import/export consulting for broadcast manufacturers.

DX COMMUNICATIONS ✓
10 Skyline Dr., Hawthorne, NY 10532
914 347-4040
Receive-only earth stations; block down-converters; LNAs; modulators; 12 GHz equipment; satellite accessories, splitters, dividers, line amps.

SACHTLER CORP. OF AMERICA ✓
400 Oser Ave., Hauppauge, NY 11788
516 231-0033
Camera tripods, heads, pedestals, ENG braces, dollies.

SONY PROFESSIONAL AUDIO PRODUCTS ✓
Sony Dr., Park Ridge, NJ 07656
201 930-1000
Mic mixers; portable, stereo-studio, audio-for-TV consoles; console automation, video interface for consoles. Audio cassette player/recorders. Portable, two-/four-track studio, & multitrack ATRs; audio layback system; center track time code recorder/reproducer. Digital audio recorders. Replacement heads. Open-reel tape; audio cassettes. Electronic audio editors; SMPTE time code synchronizers; editors for digital audio. CD/DAD players. Parametric equalizers. Digital audio efx, reverb; digital audio delay. Monitor speakers; headphones. Dynamic, electret/condenser, RF, lavalier, & shotgun mics; mic booms, dollies. Audio monitor/power amps.

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201 930-1000
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In the Video section of the Instant Source Locator, add Environmental Satellite Data to the H. Electronic Arts/ Graphics category for Digital art/paint systems.

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NEWS BRIEFS

The FCC has decided that the **fairness doctrine** is no longer in the public interest due to growth in "the information services marketplace," and that the doctrine actually chills coverage. The Commission said it will continue enforcement however, as legally required, and Congress reiterated its support for the doctrine.

Mexico and the U.S. have a new **AM agreement**, which is expected to be signed and in effect by late fall. Major features are nighttime operation by U.S. stations on Mexican Class I-A clear channels for existing daytimers on those channels; Mexican use of U.S. clear channels with protection for U.S. stations on those channels based on 10 percent interference curves; and post-sunset operation by daytimers, who now stop at 6:00 p.m. local time, in most cases until two hours after local sunset.

KISW-FM, Seattle, is getting the world's most powerful **FM transmitter**, according to Broadcast Electronics. The company is installing its second 60,000 W transmitter; KGOL,

Houston has another . . . **Studer Revox** donated a PR99 MKII compact open-reel recorder to the Museum of Broadcasting in New York city for transcription of 16-inch discs.

The FCC has amended its rules for determining and maintaining **TV aural transmitter operating power**. Stations can now choose their method of measurement or instrumentation to keep power from exceeding 22 percent of authorized peak visual effective radiated power. Specific types of power metering or meter calibration procedures (Section 73.663) were also killed. UC

RCA American plans to launch two of three high-power **Ku-band** satellites by year's end. Conus Communications will be one user. RCA says over 400 stations have asked for the free downlinks that it and Hubbard's USSB are offering . . . WISN-TV, Milwaukee's ABC affiliate, has become **Conus Communications'** twenty-second station.

The U.S. Appeals Court rejected a request from the NAB and 13 broadcast

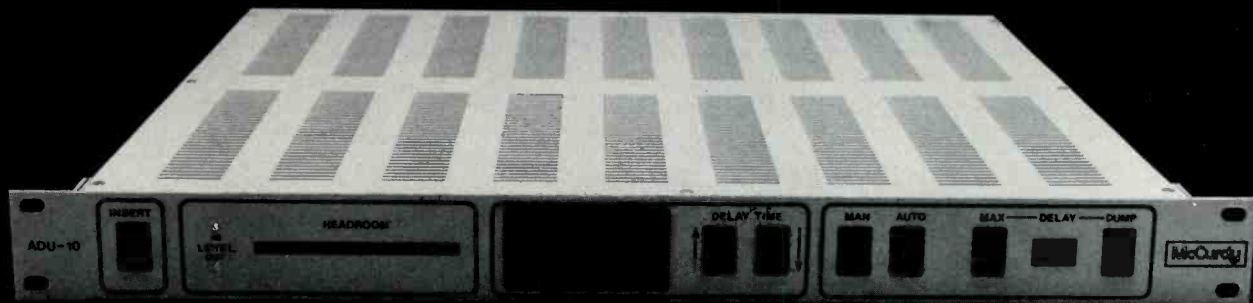
organizations to stay its decision striking down **Must-Carry** rules. The NAB says it will petition the Supreme Court but that in the interim local broadcasters may be "substantially and irreparably harmed."

An Arbitron study of **television viewing** away from home shows only four percent to be of this type among people 12+ years old, and of that 2.9 percent is at another person's home, typically a young man watching weekend sports.

The **NRBA** has initiated a move to create a "Super Radio-Only Association" and called on other associations to attend a summit meeting for that purpose. The NAB and other trade organizations are reportedly cool to the idea but have suggested three dates, from which the NRBA had not picked any as of presstime.

The **NAB** has changed its bylaws to add two seats representing major station groups to its 35-member Radio Board . . . **INTV** has gained its one-hundredth UHF member, WCAY-TV of Nashville.

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RADIO programming & production

Old Time Radio Benefits from New Technology

By Judith Gross
Associate Editor

The people of Lake Wobegon, Minnesota, probably don't know much about satellite uplinks. They tend to be suspicious of modern ideas, as their creator, Garrison Keillor, is fond of illustrating on his live weekly radio program, *A Prairie Home Companion*. But suspicious or not, satellite technology is the main reason Lake Wobegon finally has a place, albeit fictional, on the Minnesota map.

"The little town that time forgot, that the decades cannot improve" has become the most durable and popular feature of a radio show which, by all logical estimations, should not have succeeded in this world of modern radio.

The show, like the town, is the creation of Keillor, a humorist with a love of radio the way it used to be: live, spontaneous, full of warmth, good music, and plenty of folksy humor.

Five years ago, the show went from a mostly regional one distributed by Minnesota Public Radio, to a national broadcast which is currently distributed by APR (American Public Radio—not to be confused with NPR) via satellite to nearly 300 affiliates. This summer, the show celebrated its eleventh anniversary.

Double audio mix

What makes *A Prairie Home Companion* stand out among other radio offerings is also what poses the biggest challenge for executive producer Margaret Moos, technical director Lynn Cruise, the performers, and the entire staff, including Keillor himself—trying to achieve the production values of a good radio broadcast while performing before a live audience.

"It is a challenge, especially for the performers, who might be tempted to play to the live audience," explains



Garrison Keillor and The Butch Thompson Trio rehearse *A Prairie Home Companion* flanked by numbered mic stands and mic connectors.

Moos, who has been with the show since its start. "The live audience is part of the show, but they are there watching the broadcast; we play to the radio audience, which is the larger audience."

The radio/live combination poses some interesting logistical problems, especially for TD Cruise, who has to worry about a double audio mix, one for the theater, and one for the broadcast, accomplished on separate mixing consoles.

"The broadcast mix is designed to achieve a more intimate sound, whereas the house mix is designed to fill out the auditorium and emphasize those things that don't carry well from the stage," Cruise explains. This is especially tricky in a large theater, such as this past summer, when the show played to an audience that numbered 900 in Red Wing, MN. Audiences have numbered up to 1700 in the show's temporary home at St. Paul's Orpheum Theater, and up to 2500 when the show was on the road in places like Louisville and Nashville.

The broadcast mix is done on a Studer 269 console, which gives 23 mic channels and additional line outputs. A 169 submix allows for expansion when

there are a larger number of performers or guests. For the house mix, Cruise uses a Yamaha console, because fewer inputs are required than for the broadcast. She also uses a Yamaha submix to produce the audience reaction, which is an important part of the show.

Live, natural sound

Miking the audience is an important part of Cruise's work. She wants to give the home listener a feel for the live performance of the show without over-producing. She uses four to six mics on the audience, including a pair of AKG 414s, hung high and tucked out of sight, and a pair of PCMs on the wall that are also invisible to the audience. "Generally, the 414s give the sense of the hall and audience size—we don't want it to sound like too much or too little," Cruise explains. "I want to give the home audience the live experience, so it's a translation, not an actual mix for delivery." Cruise doesn't like to process the sound of *A Prairie Home Companion*, feeling that too much processing would take away from the natural and informal sound of the program. But she does use several Urei room equalizers, to equalize the house sound

RADIO PROGRAMMING

and even to flatten out the feedback and reflections in the room.

Cruise also has a Lexicon digital reverb unit on hand, which she uses when there are large bands or choruses on the show. She does close miking for the brass, then uses the reverb to give the effect of the larger room to the radio signal, because she says it "gives a sense of filling the house" to the home listener.

She is also experimenting with compression-limiting.

"It's difficult to get it right," she observes. "On a live show you are entitled to use it, but it's hard to get a perfectly natural and transparent sound when you compress. Also, you don't want the pumping on the audience or applause, so it's difficult to get exactly what we need." At times when the show could benefit from a little more compression, Cruise usually rents one or uses a demo model, but she says the show will probably purchase its own when she decides exactly what fits her needs.



A *Prairie Home Companion* technical director Lynn Cruise tests the sound mix on a Studer console for broadcast and a Yamaha for the house sound prior to the start of the live show. (Photo courtesy of Ray Marklund.)

Massive miking

On stage, there are some 20 mics for an average show, but that number could climb as high as 45 when there is a large

band, choir or both. Cruise uses Shure SM 85s, and AKG 452s on stage, primarily with cardioid CK1s, and occasionally with Omni CK2s, but she tries not to overexaggerate them during the mix.

"I want to give the impression of a few casually-placed mics that people just kind of saunter up to and use. If you hear mics opening and closing, I've goofed," Cruise admits, although that rarely happens. It's no accident then, that the overall effect is one of eavesdropping on a live broadcast.

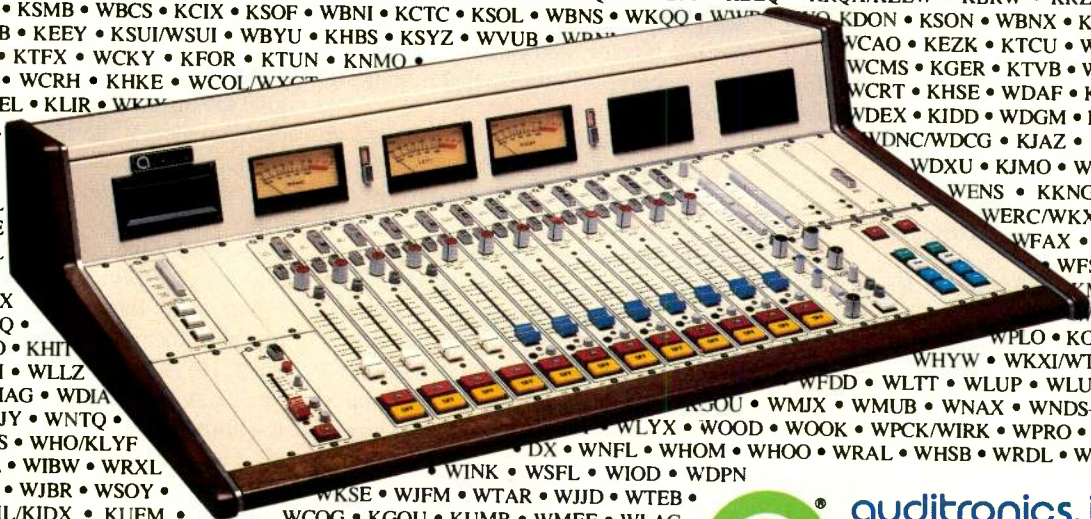
A *Prairie Home Companion* is broadcast in stereo, and most of the APR affiliates that air it are public FM stations. Cruise says she uses close miking, and pans mono, then uses a stereo pickup which is mixed in.

"It's an overall pickup, and I add it to give it a three-dimensional sound, back, front, and so on. Severe separation would make it hard to give the effect of what's really happening live on an average stage, unless a home listener's speakers happened to be the same

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Position (please check):

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Please check the description that applies to your studio:

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

Audio Operations Personnel:

- all staff all freelance
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Number of console inputs required:

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

Number of console outputs required:

stereo _____ mono _____ AUX/FB/cue _____

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Console Operation Format:

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Need Automation? Yes No

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

Please Check:

- Yes, I wish to buy a new mixing console. When? _____
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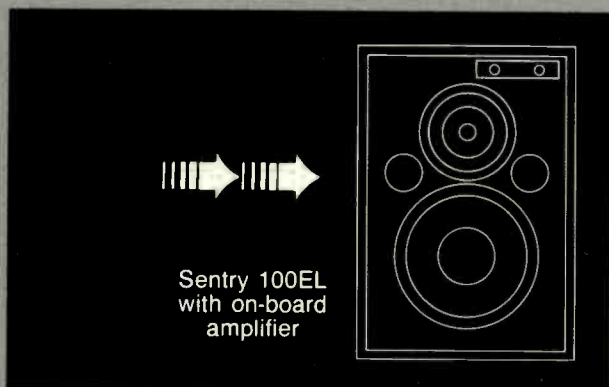
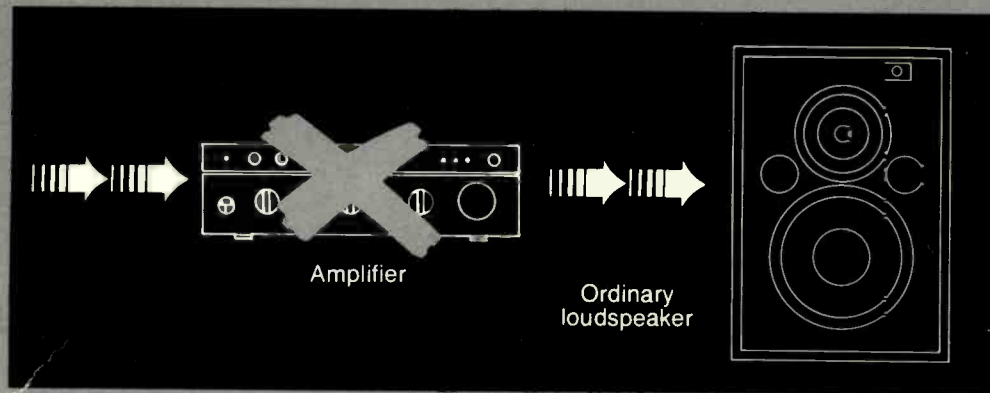
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RADIO PROGRAMMING

dimensions as the stage. It's not a literal translation."

Even with the large number of mics on stage, Cruise says there aren't always enough mics to go around. The mics are on Atlas stands and AKG booms, and solid-base stands rather than tripods, because she says "the performers move them around during the show and these can be grabbed with a minimum of noise."

It's also important for the technical crew to watch the show carefully to keep track of who's on which mic. Cruise writes a stage plan and mic plug-in plan, and the miking is run-through during the show's rehearsal, although there are always last-minute changes, which is what gives the show its spontaneous sound. The rehearsals are informal, and the crew stands by, ready to switch the game plan at a moment's notice.

Such quick changes necessitate good communications among performers, crew, and technicians. The crew uses a Clear-Com intercom system with hand-

sets to communicate during the broadcast. A lighting cue system cues the performers on time remaining, since, as executive producer Moos points out, the satellite requires precision timing.

"There's no forgiveness there," she explains, "we have to be out by one minute before the hour, or the affiliates drop us."

News from Lake Wobegon

Perhaps the biggest challenge Cruise and the rest of the production crew faces is the part of the show reserved for the "Lake Wobegon" monologue.

Shortly into the third half hour of the program, Keillor will take the mic and announce, "It has been a quiet week in Lake Wobegon, my home town," and that's the cue for the most unpredictable part of the entire broadcast. Although he appears to be ad-libbing, Keillor is weaving a story from notes which he says he writes during the week. But no one except him knows how long he will talk.

"We have to deliver Garrison's voice to the back row; his voice is soft, and on radio it's low. We want to make it prominent, but not artificial or self-conscious," Cruise explains. "The monologue is the highlight of the show, so it's tremendously important, and tremendously demanding, to get an intimate sound, not a big projected sound. It's important that he not have to shout to be heard."

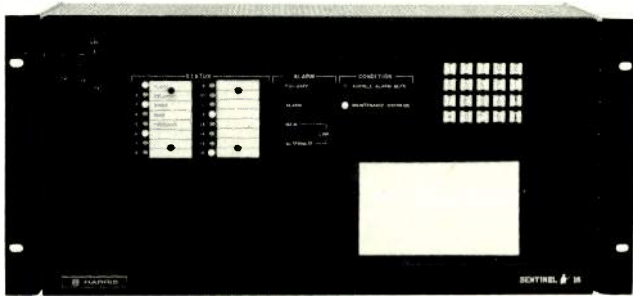
The monologue is 100 percent Keillor, with no extraneous sound. And use of sound effects, even during the other portions of the show, is either nonexistent or sparse.

Performers on the stage, especially local radio personality Tom Keith, create the sounds live. At first, Cruise explains, this was done out of a lack of equipment for such production.

"But now, audiences seem to enjoy it and it's grown to become a part of the show," she says, so tape-recorded sounds will only be used when absolutely necessary.

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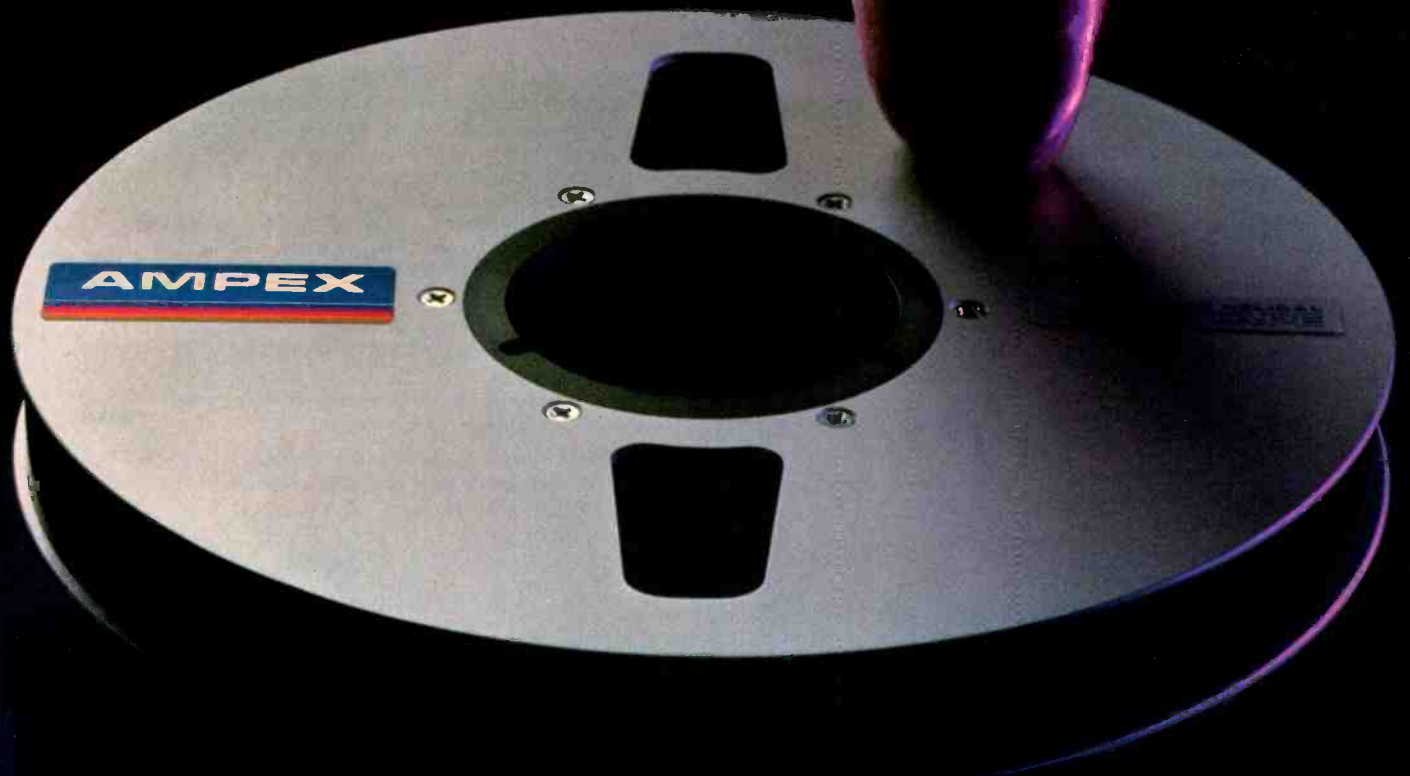
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accomplish when *A Prairie Home Companion* is at home in St. Paul than when the show goes on the road. In the Orpheum, which was the show's home until this past July, the broadcast signal was run from the theater on IF cables down a block to Minnesota Public Radio headquarters, where the network's earth terminals uplinked it. When traveling, the show uses a transportable C-band uplink.

Although it started out playing to only local radio audiences, *A Prairie Home Companion* has found it possible to walk that line between intimate local flavor and widespread national appeal.

Going national has also changed the show somewhat—from a labor of love on a Saturday afternoon to a highly professional production—without sacrificing the down-home quality.

"It made everybody get real serious," Moos observes. "The pressure of a larger audience made us rethink how we do things. The show moves a lot faster, and a lot more effort is put into the performance. We've fine-

tuned the stage movement, the introduction of the performers, and the communication among us is much better."

Keillor says the satellite has also helped bring a part of the country that is usually ignored by the media into focus for a national listenership.

"The show relates to people on an individual level, which more media are doing these days. There is no need to come out of big network centers anymore, because with satellite transmission, it's getting easier and easier to originate a radio show from just about anyplace," says Keillor. He also thinks it's changed the show.

"I think it's helped us a great deal. It has allowed us to think of the whole country, and not be so insular as we might have been before."

Thrill of live radio

By far, the best part of *A Prairie Home Companion* in its crew's opinion is the fact that it is done live, with all

the unexpected results that that might entail.

"We like the chaos and tension, and we willingly accept the imperfection," Cruise admits.

Home-grown, down-to-earth, old time radio, imperfections and all, is what has propelled *A Prairie Home Companion* into national prominence, thanks mostly to Keillor, who as the driving force behind the show has made the return of live radio his personal crusade.

"Porches, why don't they put them on houses anymore? Gardens, I miss them, I miss that sweet corn," he recently lamented in one of his Lake Wobegon monologues. "To talk about all these good things that there isn't as much of as there once was, I feel bad that, a lot of good stuff is gone

"But it is all recoverable, everything that was ever good and that was ever valued in the past, we can bring it back good old music, radio, old radio, you can bring it back. That's why I do this show." **BM/E**

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TELEVISION programming & production

Arizona Television Takes to the Road with News

By Judith Gross

KTSP-TV, the CBS affiliate in Phoenix, Arizona, has given new meaning to the term "mobile production." For one month this summer, the station broadcast its 42 live nightly newscasts, at 5 p.m. and 10 p.m., from 29 cities and towns around the state.

The event, dubbed "Celebrate Arizona," was done in conjunction with a month-long promotion by the state, and brought live newscasts, fed via transportable satellite uplinks, from places as exotic as the top of the Grand Canyon.

Station CE Al Hillstrom says that 22 technicians, crew, reporters, and anchors worked hard to make the month-long effort a success. This involved modifying existing equipment, and transporting it to two different sites each day, one for the 5 p.m. broadcast, and a different site for the 10 p.m. broadcast.

Customized equipment

The KTSP mobile production truck was the heart and soul of the "Celebrate Arizona" month. Hillstrom says it was a self-contained truck modified by the staff itself.

"Our own production crew converted single-camera EFP to a three-camera small mobile unit," Hillstrom explains. The crew used three Ikegami HL 79 cameras, and had normal program and intercom IFP systems in the truck as well.

The audio console was a Tascam Model 5 set up for four mono outputs. The truck also had a small Panasonic routing switcher.

KTSP set up a complete half-inch Betacam editing station in the truck, using Sony BVW 10s and Sony BVW 40s. Sony BVW-1 cameras were used in the field.

Hillstrom says that frame synchronizers also had to be added to the mobile unit, to be able to synchronize live



Surrounded by Arizona scenery, the KTSP news team gets ready for a remote newscast using portable equipment and set.

pickups that were used on the broadcast.

One of the key elements that made the two nightly newscasts run smoothly from remote sites was the communications, according to Hillstrom.

"Every place we went had four telephone circuits, one for the director's intercom, a second for the producer to talk to the talent, and a third and fourth for computers, to send scripts back and forth through phone modems," Hillstrom says, adding, "the unique thing was that anywhere we had the people, they could all talk and communicate with each other."

Mini-remotes

The nightly newscasts were broadcast live via transportable Ku-band satellite uplinks, first from VideoStar Connections, Inc. and then from Microlink in the latter part of the month. Hillstrom says that the VideoStar uplink was a five-meter truck, while the Microlink was a 2.3-meter portable.

But in addition to the remote satellite

broadcast of the entire half-hour, each newscast also featured what Hillstrom calls "mini-remotes around the remotes." So, while news anchors Dave Patterson and Deborah Pyburn were seated at the top of the Grand Canyon reading the news, the director was also able to switch live to Bill Leverton, the station's "On the Arizona Road Reporter," in an on-the-spot report from the bottom of the canyon. Or, Hillstrom could switch to a live helicopter report nearby, or to the sports anchor broadcasting in yet another location in the state and the weatherman from even another location. That's why, Hillstrom stresses, communications and synchronization were so important to the production of the newscasts.

The newscast script was written at the remote anchor site with some of it added back at KTSP studios. Stories were transmitted back and forth, and eventually the nonanchor parts of the newscast—taped stories, live mini-remotes, sports, and weather—were all controlled from the studio, as Hillstrom explains.

"Before we went on the air, we fed

TELEVISION PROGRAMMING

back pretaped stories to the studio, where they were coordinated with the rest of the newscast. It was just like a normal live-at-five newscast, except we were 300 miles from the studio."

For the weather and sports remotes, the station used a direct microwave path from the weatherman, who was never more than 100 miles away, back to the studio. The sports remote was from a separate site via microwave, but the graphics and character generator were added at the studio.

Support equipment

KTSP used its regular Sony lavaliers for the two anchors, and set up portable lights on folding stands. The anchors, however, had to learn to live without a teleprompter for the month, since the station doesn't own a portable model.

For its regular communications, KTSP used a Cetec Vega wireless system.

Although the amount of equipment needed each night was considerable, and the crew had to travel quickly to be



Transportable Ku-band uplinks helped bring KTSP's newscasts from far-reaching parts of Arizona along with the station's customized mobile truck.

at the second location in time for the 10 p.m. newscast, Hillstrom said the whole operation went smoothly for the most part.

"After a very short while, the break-

down took only 30 minutes, and the set-up time one hour."

He says that the 10 p.m. newscast was run differently than the earlier newscast, because travel time was lim-

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TELEVISION PROGRAMMING

ited to only one hour.

To transport people and equipment, KTSP used two RVs, three cars, three pickup trucks, the uplink truck and the customized mobile unit truck.

The Arizona summer climate did pose some problems for KTSP. The air conditioning had to be doubled in the production truck and uplink truck during "Celebrate Arizona" month, because as Hillstrom pointed out, the mercury climbed to 112 degrees one day. But there was no air conditioning on the anchors, and Hillstrom says they were "somewhat uncomfortable."

For the most part, Arizona's dry weather held out for the newscasts. But one night, according to Hillstrom, just before the 5 p.m. show, it rained hard, and technicians raced to cover the \$100,000 worth of equipment. But fortunately for the station, the rain stopped just before air time, and the broadcast could go on.

Programming and promotion

The unique look that KTSP achieved by locating its anchor desk in various

parts of Arizona didn't stop with the newscast itself. For the month-long project, new theme music, news opens, animation, and bumpers were created.

KTSP purchased an exclusive music package, but nearly everything else was done in-house. The art staff, using a ColorGraphics ArtStar II, designed the "Celebrate Arizona" logo which appeared on mobile trucks, bumperstickers and the letterhead. Some ADO effects were added by station technicians at a nearby production house, then taken back into the station's own production studio for some added animation on an in-house Quantel DVE. The finished product was a logo in motion with sparkle and glimmering touches added. The station thought the new graphics so successful that they have kept basically the same look and sound to news opens and bumpers created since this summer, but minus the "Celebrate Arizona" theme.

The station also carried the theme over into six special programs that provided in-depth reports on the Grand Canyon, the most scenic parts of the

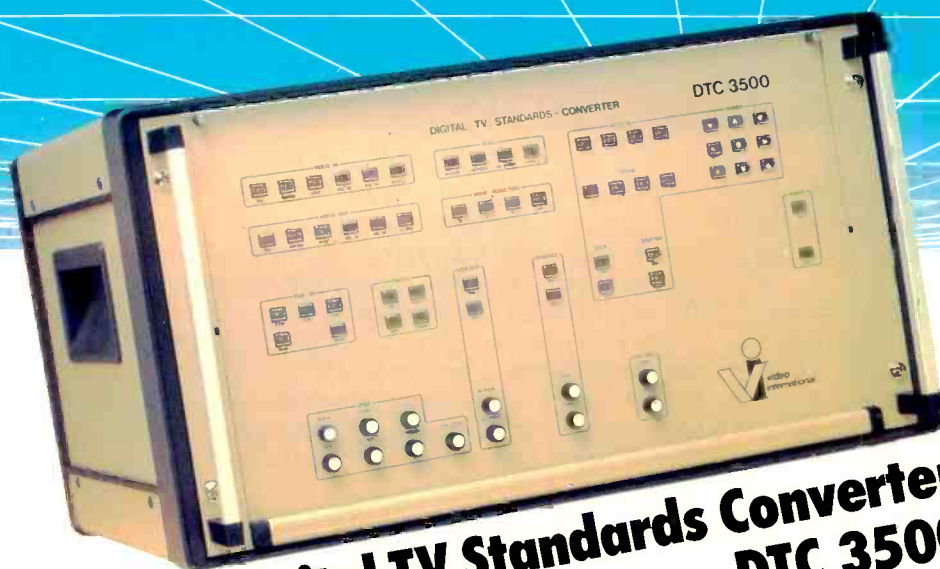
state, and folklore, legends, and myths about Arizona's ghost towns.

KTSP's work and effort brought the excitement of live TV to many small Arizona towns, and local activities were the focus of the features on each newscast, although Hillstrom says the news department was careful to maintain its usual balance of hard news stories.

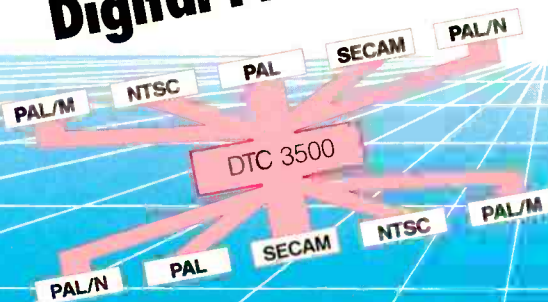
Many of the newscasts coincided with the timing of local fairs and festivities. The state office of tourism opened a special hotline in conjunction with the "Celebrate Arizona" month, and along with *Arizona Highways* magazine, gave away free state maps.

Despite the frenetic pace, tremendous work, and effort that went into the success of the month-long endeavor, Hillstrom and everyone connected with it felt it was worth it, although it won't be until September that the ratings will show for sure.

"We're expecting them to be good; we got a tremendous amount of feedback and local press from small communities," Hillstrom said. **BM/E**



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dead issue.



simultaneously. So in the unlikely event that your "on air" transport fails, the MVP-100 can be programmed to switch to the protection copy maintaining broadcast continuity.

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THE 127th SMPTE: MARKED FOR GREATNESS

This fall's SMPTE conference is already distinguished as the largest in SMPTE's history with a sold out exhibit hall of 245 companies, and there are signs that it will also be the most stimulating show ever. The following interviews, program topics, and exhibit listings gathered by BM/E all indicate that the 127th Technical Conference and Equipment Exhibit will have no trouble living up to its official theme, "New Directions In Technology — Difficult Decisions."

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Eady Seeks TV Standards, Members

With another year left in his term as SMPTE president, Harold Eady has two major goals for the society.

He wants SMPTE to continue to be the standard-setting body for the TV and motion picture industries, and he wants to recruit more members, especially from the TV industry.

Although setting standards is a priority, Eady believes this will come about only by providing an open forum for research and discussion, and by letting the industry itself decide how standards will emerge.

"We can't take sides, telling manufacturers what to market," Eady cau-



Harold Eady, president.

tions, "we can only provide the platform; unlike the EBU, we can't dictate standards."

Eady says that standards on questions such as HDTV and 1/4-inch tape will emerge from agreement among manufacturers, and he cites two-inch quad as an example of where this has worked in the past.

He says that recent attention on new electronic technologies has put pressure on the society to implement standards, but warns that most people misunderstand SMPTE's role.

"A lot of people misunderstand SMPTE's role in standardization—they think we can say this is the way it will go, but we can't say that without industry approval," Eady explains.

Just how far away some of the stan-

dards are that the committees are considering is hard for Eady or anyone else involved in the ongoing work to predict.

"One of the major issues I'd like to see resolved soon is that of digital VTRs, also a choice of a set of multiplexed, analog component parameters for TV studio operation," Eady says.

He envisions a digital recording standard being put in place during his two-year tenure, and says there could "possibly" be standards in that time as well for parallel and serial interfaces and component analog standards.

But he says that standards for HDTV and 1/4-inch are probably more than two years from being resolved, although in the case of 1/4-inch he maintains, "The user can make it happen better than we can, say if the networks unite and tell the manufacturers what they want." But right now that seems unlikely.

SMPTE membership is currently in excess of 8500, but Eady would like to see that number grow, not for the sake of growth alone, but to reflect the tremendous amount of activity that has taken place on the television side of the industry.

"I want to be sure this dramatic increase is reflected in our membership, and I'd like to recruit more video production people, TV stations and networks," he says. A presidential advisory panel meeting later this year will address the issue of how SMPTE can modify and increase its services on the TV industry, according to Eady.

Eady says of the direction of SMPTE and the industry as a whole that future concerns will focus away from the question of video versus film and will incorporate them both under the concept of electronic imaging.

"The future is electronic imaging," says Eady, "not TV or film."

HDTV Progress Slow

It's unlikely that a worldwide standard on HDTV will be established in the near future. In fact, despite much cooperative work between the Advanced Television Standards Committee (ATSC) and SMPTE in this country, worldwide standards are still being delayed by lack of agreement and seem farther off than ever.

According to Kerns Powers, chairman of SMPTE's New Technology

Committee, the objective was to have an agreement, at least with the EBU, on an HDTV standard in time for the CCIR's Geneva meeting at the end of October. But he feels now that that's unlikely.

In the past year, the ATSC, with SMPTE as a participant, threw its support behind the Japanese NHK standard. But Powers explains that SMPTE proposed modifications to the Japanese standard that were agreed upon by the ATSC. Powers says the primary reason for the modification was so that HDTV would be more compatible with the film industry. According to Powers, the proposed change is being researched around the world.

But he cautions that there is an even more basic problem with the ATSC-SMPTE-supported Japanese standard, and that is the 60 Hz field rate. The field rate proposed in Europe and supported by the EBU, China, the USSR,



Kerns Powers, New Technology chairman.

and many other countries around the world, however, is 50 Hz.

"That is the key problem and it's not likely that any agreement will come about, not simply before the CCIR meets, but at all," Powers says.

"The basic objective is to get the Europeans to change and get some kind of agreement with EBU," he says, adding, "in the interest of our grandchildren, when HDTV will be order of the day, it will be advantageous to have only one system, rather than the 13 that exist today."

Powers concedes that the 60 Hz standard creates problems of backward compatibility, but he maintains, "Those are regarded as interim technical problems which can be solved, but will at least permit the world to have a

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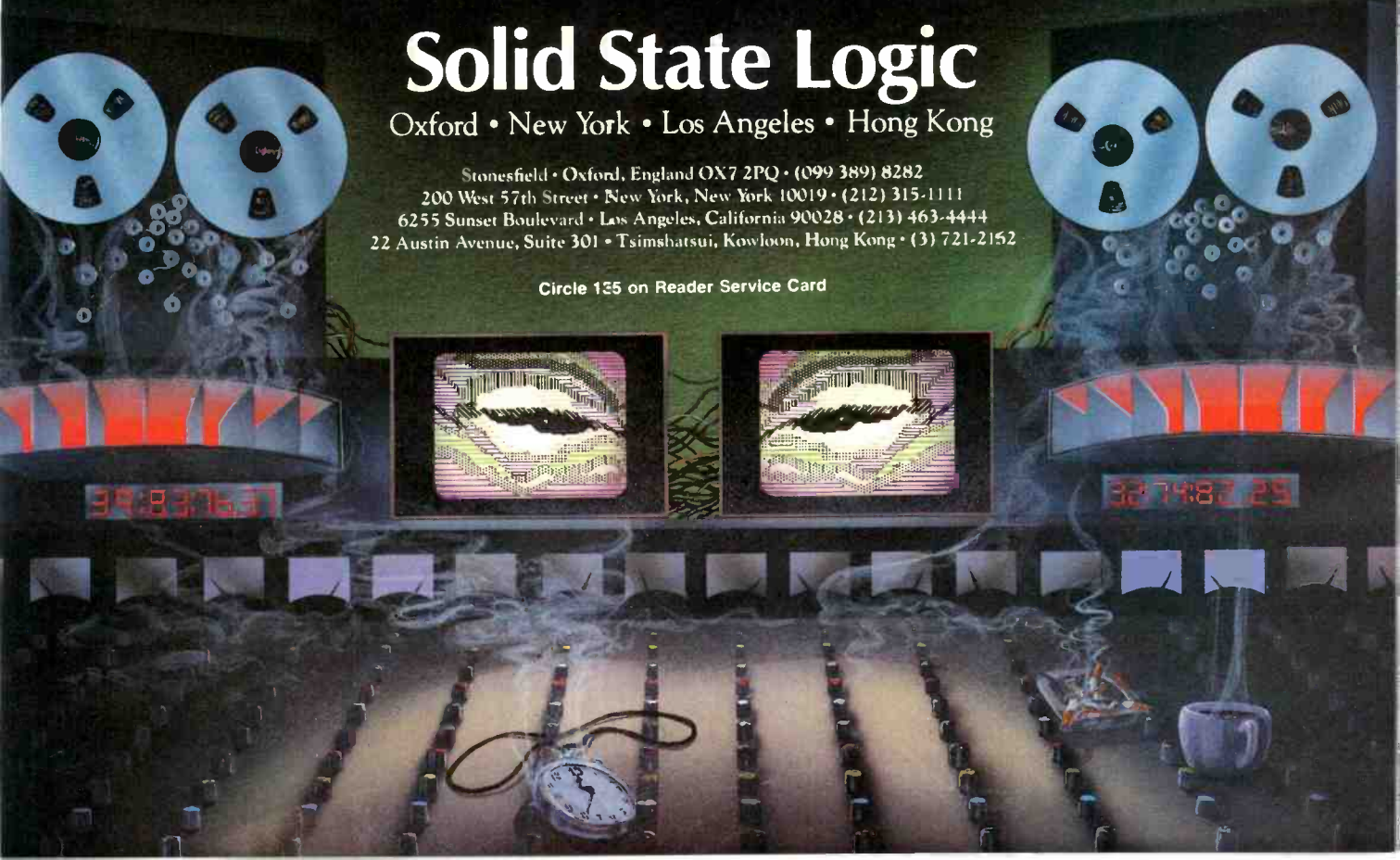
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single standard for the future."

Unfortunately, according to Powers it doesn't look as if there will be any agreement on HDTV standards for a long time to come.

"It is not very hopeful now, and it will take a number of things, mostly convincing everyone that the goal is worth the troubles to get there."

Powers still believes, however, that it is possible to get an agreement on HDTV worldwide standards within the next four years, but with a caution.

"If it doesn't get resolved in 1985 or early '86, in this cycle," he warns, "there would either be a proliferation of incompatible de facto standards, or the delay of intro of HDTV until a standard is resolved, which could take four more years."

Since the CCIR meets in Geneva at the same time the October SMPTE conference takes place, the stalemate over HDTV is sure to be a much-discussed topic in Los Angeles.

TV Technology Committee Looks Beyond Component Analog

By the beginning of 1986, there should be standards in place for component analog television, according to Ken Davies, chairman of SMPTE Committee on Television Technology. The working group on component analog recently submitted proposals for three-channel parallel component analog standards and a standard for a single-channel multiplexed analog component (S-MAC) interface. Together they establish the basic criteria for component interfaces in both the parallel, three-channel, and serial, single-channel S-MAC forms.

According to the working group, the two standards were designed to be compatible with CCIR 601 on digital TV studio interface. The parallel interface was coordinated with the EBU, which has just begun studying the single-channel interface.

Davies says the first approval of the component analog standards will most likely come about at the October SMPTE Conference, with standards

committee approval in January. Work on a digital serial interface, meanwhile, is still very much at the advanced research level, Davies says.

According to Davies, the Television Technology Committee is already looking ahead to the next order of business—focusing on color imagery standards, especially those needed for the exchange of pictures back and forth between component systems, HDTV, and film.

"We need to examine what would be the appropriate gamma correction, say, of something produced on HDTV and released on film, or produced on film and released on HDTV, PAL, component, and so on," Davies explains. "We need to look at how the system displays color images."

Davies believes that it may be possi-



Ken Davies, Television Technology chairman.

ble to come up with new color imagery standards, but says that initially, with reproduction needs, such as in going from HDTV to film, conversion standards would be a priority.

He feels the fast moving pace of the technology creates an immediate need to address color imagery standards.

"We need to look at what's desirable and what we have now, do the mathematics, and show how it could work, and perhaps in a year or 18 months we could come up with new standards proposals," Davies says, adding that it's work the committee recognizes as "urgent."

Digital Moves Forward

SMPTE's Video Recording and Reproduction Technology Committee has put the finishing touches on standards for digital recording and is expecting swift approval from its own hierarchy as well as agreement with the EBU, which has been working closely with the committee, and the CCIR.

Committee chairman Bernie Dick-

ens says the CCIR's study group has already begun looking over the standards proposals in time for its October meeting, and that final agreement is anticipated when the CCIR plenary meeting is held next May.

The committee had previously agreed upon several factors concerning digital cassettes: tape width, material, thickness, dimensions, also mechanical footprint and control track configuration. Now the committee has also agreed upon the channel coding, shuffling strategy and mechanical tolerances as well.

"At the CCIR study group meeting in October, we expect approval of these documents since major manufacturers are in agreement and gave input in their development," Dickens says.

But another standards issue, that of 1/4-inch tape, remains stalled, perhaps indefinitely, according to Dickens. In the time since SMPTE's compromise format was rejected, it was recommended that the committee take it back for further study. But Dickens says that there isn't much in this area that the committee can do.

Dickens likens the situation with 1/4-inch to that of half-inch, and says that what will probably happen is that each manufacturer will stay in the marketplace and present documents to get each of the individual 1/4-inch formats registered. That being the case, there would be at least two 1/4-inch formats on the market, paralleling the situation with half-inch recording.

Dickens says it's possible that work on developing a standard for 1/4-inch started too late, after manufacturers had made a substantial investment in their separate products. He believes that the much larger investment needed for digital recording products is what saved digital from the standards snafu which developed with half- and 1/4-inch.

Streeter Looks at SMPTE Structure

For Dick Streeter, SMPTE's engineering vice president, setting priorities that reflect many rapidly changing technologies is as important to the future of the organization as the matter of setting standards.

His main concern for the future is whether SMPTE should look outward

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or inward to define the areas of technology it should be exploring.

"How do we best examine what's coming up in the future, should we rely on inputs from industry, or should we have in the SMPTE organization itself the means to bring up new topics?" Streeter asks.

He says SMPTE is looking at how to set up a structure to determine future directions.

"Right now we're heavily involved in the digital world, trying to look toward timetables," he observes.

"But questions have been raised—should we be involved in imaging, in still cameras, where does that fall into our overall mix, or is it too consumer-oriented?"

Streeter says there are ongoing discussions on "where is the technology moving?," but that there is no formalized agenda, no five-year plan.



Richard Streeter, Engineering VP.

"In the final analysis, what we do is meet the requirements or needs as dictated by the industry," he concludes.

Streeter feels the best example of how the SMPTE structure works is the current progress in digital recording.

"It took the cooperation of the manufacturers, it was done in a timely fashion, and it was seen as not advantageous to rush it into the marketplace," Streeter points out. He adds that working in "a parallel effort" with the EBU also helped move the issue of digital recording standards along.

"That's a natural way to do it, because manufacturers who produce for U.S. and Europe are the same," he maintains.

"We had the experts, manufacturers, and users all acting on the same information," Streeter adds. "We weren't duplicating each other's efforts."



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Hopes to introduce a new lens, and will definitely show its very lightweight 14x8 super-wide angle ENG lens and a 14x9 ENG lens. Angenieux lenses for studio cameras will be featured at the Philips and Thomson-CSF booths. New cine lenses also will be premiered.

ANTON/BAUER 1509

Will show newer products, premiered at NAB, including the Ultralight system of compact, lightweight portable lighting, comprised of single and dual models and the UltraKit; mobile fast chargers, a one-hour fast charger or 16-hour charger that operates from most vehicles; dual battery holder; LPS-4, a linear 13 V, 4 A, 115/120 V ac power supply. Established products will be the Pro Pac 13 and 14 snap-on nicad batteries and Pro Pac 90 VTR battery; Lifesaver nicad chargers; 30/13 dual voltage battery belt; PPSAD perpetual power belt; plus silver batteries, ac power supplies, Black Beauty lighting system, and the Micro Control portable camera control system.

ANVIL CASES 1646

Will introduce a new product at the show, along with its regular line of electronic rackmount cases and cases for cine and video support equipment.

APHEX SYSTEMS 601

Will show the recently introduced Model 9004 mic preamp, in a modular format, and the 402 self-powered mic preamp in a two-channel, rackmounted package. Other products will be the Aphex II Aural Exciter for audio enhancement and the Compellor program-controlled compressor/leveler/peak limiter.

ARRIFLEX CORP. 1425

Will present lighting and grip equipment, including the ARRI 12,000 W HMI first seen at NAB, and will show its full line of HMIs, a 200 W fresnel, 575, 1200, 2500, 4000, and 6000 W ARRI HMI lights; ARRISUN 5 and 12, 575 and 1200 W PAR lights; CineJib video and film camera crane, and ARRILITES, portable lighting kits with 650, 1000, 2000 W fixtures.

ASACA/SHIBASOKU 124

Will show products from its established lines of audio and video monitoring and test and measurement equipment. At NAB, ASACA introduced the ACL-6000B, an upgraded video cart system holding up to 600 carts, the

Watch For New Technology

Urged on by the overwhelming success of last year's demonstration of high-definition television equipment, SMPTE's Engineering and New Technology Committees have organized New Technology Demonstrations covering three "happening" areas: HDTV, enhanced video, and advanced transmission systems. Interested parties have been invited to show prototype systems in areas separate from the exhibit floor. The demos will probably be run for about two days.

Don McCroskey, chairman of SMPTE's program committee and former manager of A/V systems for ABC, said in a telephone interview that the theme or purpose will be to

educate people about the "bewildering assortment" of systems available. The committees want attendees to be able to see "exactly what the systems do and don't do," he said. He noted that the committees expect a lot of interest in this part of the show.

Though the list of participants will probably not be definite until the show itself, SMPTE would like to show a total system in the HDTV demo, which is tentatively scheduled for October 30 and 31, plus, possibly, some new equipment. The HDTV demo at Montreux included Grass Valley Group's experimental switcher, Quantel's Paintbox, and Barco monitors. For Los Angeles, it's said that among new high-definition equipment which might turn up are an Ultimatte and a Philips field store.

ASC-200, a standards conversion system for PAL, SECAM, and NTSC, a stereo TV sound signal generator, HDTV equipment, and a variable line rate encoder.

ASTON ELECTRONICS 903

Will premiere the Aston 4 production character generator with multiplane display, 4096 color palette, diagonal writing and a library of over 1500 typefaces. Effective resolution is 10 ns. The A3 character generator will also be shown.

AUDIO ENGINEERING ASSOC. 1838

Will show its recently introduced AEA-MS 38 stereo box with MS stereo, XXY stereo, and dimension variable control, plus its established line of mixing consoles, tape machines and A/V synchronizing equipment.

AUDIO PRECISION 800

Will make its SMPTE debut by releasing a new IM distortion option for its System One, the PC-based automatic audio test system introduced at NAB.

AURORA IMAGING SYSTEMS 1538

Will bring its AU-125 and AU-75 digital videographic painting and animation systems, which also provide drawing, font generation, and weather graphics capabilities.

BARCO INDUSTRIES 1643

Will present its CTVM and CTVM-3 Series broadcast monitors, along with the CM Series professional monitors,

featuring the CM-22, a nine-inch portable monitor with AKB to eliminate color or temperature drifting, RGB input, and switchable comb filters. Also seen will be the PCD-3 Series chroma decoders and the HDTV monitor.

B&B SYSTEMS 1604

Will be taking orders on Imagescope, seen in prototype at NAB. Imagescope provides a visual display of stereo imaging and perspective and is designed to insure compatibility when broadcasting stereo to mono receivers. It can be used for miking and mixing. The established line of stereo phase scopes will also be on view, including the AM 1, 2, and 3 for TV post-production, FM broadcasting and recording studio use, and stereo TV broadcasting, plus the MP4 Series standalone meter panels.

BELDEN COMMUNICATIONS 506

Will have its Modulight convertible softlight, which offers 1-16 kW operation. Also the Lee 8 kW HMI, 200 W portable sun gun, and lines of filters, resin camera filters, and polyester photo filters.

ROBERT BOSCH CORP. 546

Will premiere a new paint system, one which the company predicts will be competitive with anything yet on the market. Bosch is also bringing out two new software packages for the FGS-4000, the Multi Lightsource Editor with 16 colorable, animatable light sources, and the Terrain Modeler, which can produce fractal, mountain-like shapes. Other product introduc-

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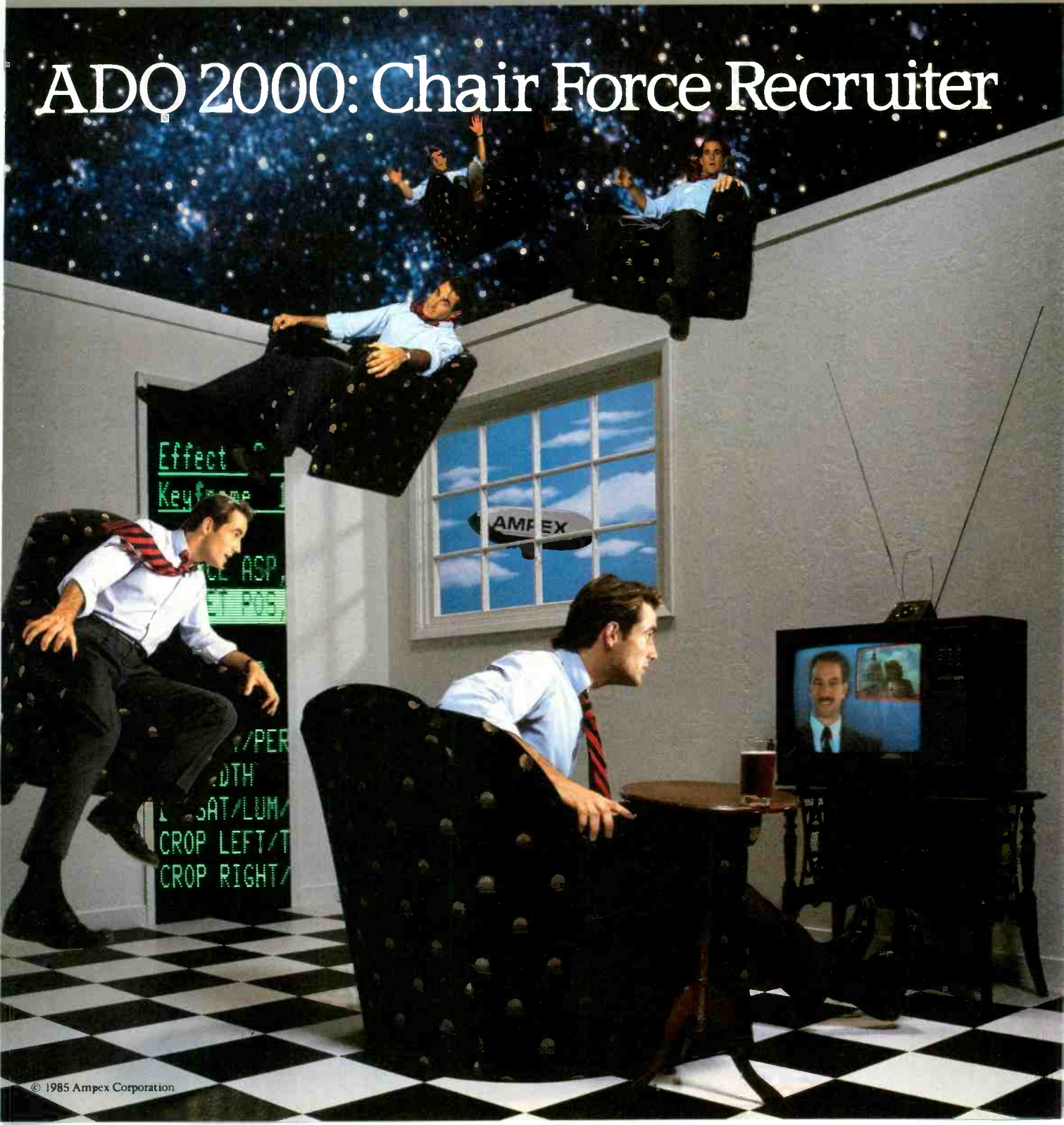
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ADO 2000: Chair Force Recruiter



CCD-1 Joins the Gallery of Excellence

RCA Broadcast Systems is proud to add a fifth Emmy to our collection. This one was awarded for the development of CCD technology that resulted in the design of our CCD-1 camera.

The CCD-1 is fast changing the "look" of television. It's a picture-perfect "look" with no lag, no burn in, no comet-tailing. The camera has outstanding dynamic range and superior low light level operation to capture those tough ENG shots. The CCD-1S sports camera version can slow down fast action to provide viewers with crisp, sharp pictures of the stitches on a 90 mile per hour fastball—and it can stop the motion when the tennis ball meets the racquet.

We thank The National Academy of Television Arts and Sciences for this honor, and the television industry for their acceptance of the CCD-1.



RCA Broadcast Systems,
P.O. Box 900,
United States Avenue,
Gibbsboro, N.J. 08026.

RCA

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tions will consist of new signal equipment, including audio and video amplifiers; a new X,Y zoom for film-to-tape transfer with the FDL-60; and new control panels for the TAS/TVS 2000 distribution switcher.

Established equipment will include the Quartercam recorder/camera system, MCS 2000 master control switcher, and FGS-4000 computer graphics system.

BROADCAST ELECTRONICS 504

Will highlight its recently introduced TZ-30 TV stereo generator as well as the 5400 three-deck cart machine series, 3200 and 2100 single-deck cart machines, and the 4R50 rackmount, four-channel mixing console for remote broadcasts.

CANON USA 902

Will show its full line of broadcast lenses, including the J8x6B super wide-angle lens introduced at NAB. Canon will also be featuring its own line of tripods, dollies, and pedestal camera heads, which premiered at NAB.

CENTRAL DYNAMICS 1142

Will present the following products which were introduced at NAB and will be seen at SMPTE for the first time: an automated master control switcher, in stereo or upgradable to stereo; the SDS-2 routing switcher; and from the 80 Series line, the CD-680 production switcher with ISO Key for multiple keys with preset, a feature that debuted at NAB. Other equipment will be shown from the existing lines of downstream keyers, DAs, and other production equipment.

CENTURY PRECISION OPTICS 605

Will bring its Periscope V16 periscope lens, introduced at NAB, designed specifically for 2/3-inch video and 16 mm film cameras, with f/3.2 1:1 relay optics and interchangeable camera mounts. A wide-angle adapter set is also new, consisting of two precision-manufactured elements. Other products are the line of telephone lenses for video and lens accessories.

CETEC VEGA 1546

From among its lines of wireless microphone and wireless intercom systems, Cetec will show its PRO 1-B bodypack and PRO 1-H handheld wireless mic systems. The 1-B consists of the Model

T-37 bodypack transmitter and R-31A receiver, while the 1-H includes the Model T-36 handheld transmitter and the R-31A receiver. Both feature DYNEX II, Cetec Vega's audio processor for high S/N, wide dynamic range, and natural sound.

CHRISTIE ELECTRIC CORP. 849

Will have its Reflex 20 line of burping chargers with super nicad battery packs and accessories; CASP battery/charger/analyzer/sequencer/power supply for sealed nicad packs and other types of batteries; and MaxErase 16B degausser.

CHYRON CORP. 746

New to SMPTE will be the Scribe, an ultra high-resolution text generator with 1500 foundry-generated fonts available, unlimited color selection, and unrestricted character placement. The Chameleon, a low-cost, multifunctional paint system, will also be making its first appearance at this show. Also featured will be the Chyron 4100 EXB graphics and titling system with 27 ns resolution, 12 on-line resident fonts selectable from a large font library; animation-3D rotation, MGM graphics/font compose and background graphics with a drawing table option and Digifex option for digital effects; plus the VP-2, a low-priced, high-resolution character generator with six resident fonts.

CINEMA PRODUCTS CORP. 134

Will feature its Mini-Mote remote-controlled pan and tilt head; Camera/Lens Control system for film and video lenses; Cinevid Plus image enhancer for film camera video assists; CP Co-Ax Digital Remote-Control system for Ikegami LH-79E cameras; Steadigate film gate conversion for Rank Cintel telecines; CP/Tiltplate for geared and fluid heads; WRC-3A wireless lens control systems; and Steadicam adjustable load capacity arm. Other products include the Steadicam Universal Model III; Camraprompter and Camraprompter L prompting systems; "Film Style" Studio Rig; Mini-Worrall geared head; J-6 joystick zoom control; GSMO 16 mm cine camera; CP Co-Ax Digital Remote Control; RDS/HMI Uni-Focus 200 W lighting system; and Universal matte box systems.

CINEMILLS CORP. 942

Will have its line of lighting equipment

from Daymax, Cine 60, DeSisti, Lee, and others.

CINE 60 906

Will show the modular on-board camera battery it introduced at NAB as a direct replacement for OEM conventional batteries. Also new will be a Betacam battery. Other products include switchable battery belts and packs for alternately powering 14 V video equipment or 30 V camera lights; in-line battery voltage reducer; multirate Lifeguard fast charger; 30, 14.4, and 12 V Sun Guns; miniature 12 V camera lights; pocket-sized dual-channel BP-90 battery overnight chargers; mobile 12 V dc one-hour fast chargers; dual battery pack systems; and improved battery dememorizer.

CIPHER DIGITAL 1317

Will unveil the Shadow III, a new universal time code synchronizer. Other additions to the complete line of time code, synchronizing and audio products are the 716A time code generator with programmable offsets and the 710A time code reader with true regenerating code output, both introduced at NAB and now ready for delivery.

CMX SYSTEMS 435

Will present a totally new, computer-assisted video editing system, the 3100, designed to replace the 340XL. It features multiple EDL files, 900-event memory, Autoclean, and Match, Cut, Calculate, and Learn keys. The CASS 1 computer-aided sound system, prototyped at NAB, will be shown; it is a post-production audio editing and mixing system, CMX keyboard and edit decision list-oriented, for computer-controlled accuracy over audio consoles, ATRs, and other sources. Also present will be the 3400A editing system, which adds Gizmo II to the 3400's features; it has up to 64 GPI relays and a new Dynamic Motion Memory.

COHERENT COMMUNICATIONS 1734

New products will consist of the Smart Slate, a self-contained SMPTE time code reader/generator for synching picture and sound, especially with telecine transfers; the Dumb Slate, a time code reader; and a UHF video transmitter for remote video monitoring. The regular line of radio mics, Mini-mics, PS-3 power supply for condenser mics, and MX80 portable mixer will be present.

COLORGRAPHICS SYSTEMS 603

Will bring its ArtStar 2, an art/paint system that was introduced at NAB and is available in either 24 bits-per-pixel or eight bits-per-pixel versions; plus the LiveLine 4 weather graphics system.

COLORTRAN 342

Will bring its line of lighting control consoles, dimmers, and Fresnels.

COMPREHENSIVE VIDEO SUPPLY 145

Will have its lines of interface products, computer cable, maintenance supplies, and lighting, the last including fixture kits, modulation accessory systems, and CAV software like the Edit Lister program.

COMPU = PROMPT 904

Will bring its line of color computerized prompting systems for video and film, such as the CP-2000 color computerized prompter introduced at NAB, with unlimited text length and editing while scrolling; the CP Jr., a small, lightweight camera-mounted video prompter for ENG cameras; the Compu = Prompt Deluxe podium prompter monitor system; and the Compu = Prompt uninterrupted power supply.

COMPUSONICS 1201

Will show the DSP 2002 from its 2000 Series Winchester disk-based audio recorder/editor systems; this can interface with the Sony PCM 1610 digital processor and the Mitsubishi X80 digital audio recorder. The DSP 1000 floppy disk recorder/player will also appear.

COMPUTER PROMPTING 904

Will premiere its CPC-1000, a computer-based prompter that uses the IBM PC family and compatibles. Offers color text and variable fonts.

CONVERGENCE CORP. 934

Will display its 195LM low-cost A/B-roll edit controller with three-VTR control, which premiered at NAB. Features include three built-in time code readers and one time code generator, CleanIt list cleaning program, 200-event memory, and sequential auto assembly. A new package will offer the 204LMS's four-VTR controller, A/B-roll, 800-event memory, sequential and checkerboard auto assembly with a Compaq PC running an MS/DOS-based, IBM-compatible program called

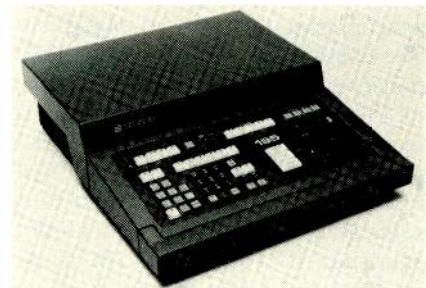
PC 300, which can store and retrieve edit lists.

COOL LIGHT 1305

Will have its L-13 and L-20 battery belts with built-in chargers, unveiled at NAB, which provide 13 and 20 Ah, respectively. The MiniCool head-free light, with a line of accessories including stands and lamps, will also be featured.

CORPORATE COMMUNICATIONS CONSULTANTS 1449

Will show its line of color correction products including the System BM for component video, and the System 60XLB3, also with time-saving automation, for color correction processing for flying spot scanners and CCD telecines.



Convergence's 195 Editing System.

CROSSPOINT LATCH CORP. 1920/21

Will introduce a new downstream key editor and also show the Model 6119 production and post-production switcher, first seen at NAB, with six inputs and optional microprocessor control. Also new will be the Model 8000 TBC, for locking two VTRs to each other and thus allowing A/B rolls with one TBC. From the regular line, the 6112AK 4x9 input switcher, a microprocessor version of the 6112, will be seen, along with the 6139, a six-bus, three-M/E switcher, and the 7239 autodrive for the 6139. An eight-input version of the 6139 will be shown; it also comes in 16- and 24-input models.

The Model 6124 four-bus, 12-input video switcher with two fully independent effects systems will be displayed, along with the 6009, an eight-input, three-bus switcher specifically designed for editor interface, which will be shown alone and in conjunction with the 7209 computer controller and editor interface.

CUBICOMP CORP. 1407

Will have on hand its Picturemaker, a

3D animation system for video production, with new enhancements premiered at SIGGRAPH.

DATUM 1814

Will unveil two new products, the Model 9550 video data encoder and 9200 video data reader, which allow digital data to be relayed in the VBI of a composite video signal. Up to 776 bits of information can be inserted; applications include transmission of control and status information, and proprietary communications. Also on display will be Datum's SMPTE/EBU time code equipment including readers, generators, character generators, and VITC options.

DENECKE 1912

Will introduce the Dcode line of low-cost time code readers and electronic film slates, including the TC-1, which reads SMPTE or EBU time code from VTS and film editing or synchronizing equipment and is priced at \$550. A preproduction model of the ES-1 electronic slate will be seen; it provides a one-inch high-intensity LED readout without sync cable, for film or video production. Cost is \$980.

DESISTI AMERICA 966

Will have its line of lighting equipment, including CID spots, HMI PAR instruments, HMI softlights, lightweight stands and grips, fresnels, cyscs, and related items.

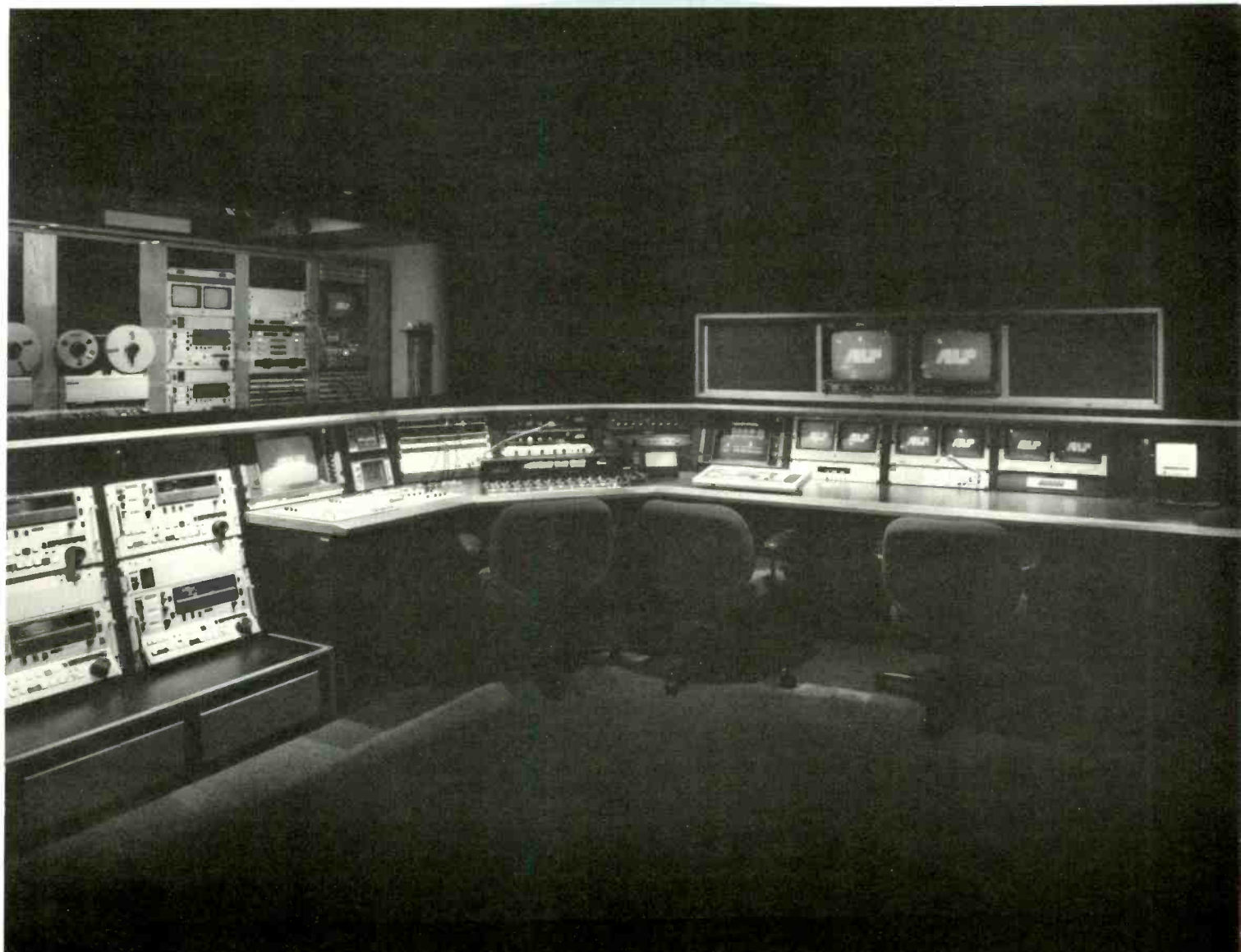
DIGITAL ENTERTAINMENT CORP. see QUAD EIGHT/WESTREX

DIGITAL SERVICES CORP. 509

Will premiere a component version of the Illusion digital effects system. A PAL version of this equipment was shown at Montreux and is now being offered for the first time in NTSC. A single-channel Illusion with still store will also be seen, as well as the multichannel Illusion.

DIGITAL VIDEO SYSTEMS 418

Will unveil a totally new line of low-cost, one-RU TBCs, TBC frame stores, frame synchronizers, and test signal generators. Regular products will be represented by Four-Matte, which displays four video signals on one monitor, and SA B-MAC communications products.



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DOLBY LABORATORIES

1335

Will feature its noise reduction for one-inch videotape machines in both plug-in and outboard versions. Also appearing will be noise reduction systems for multitrack recorders for post-production and film sound production applications.

DROID WORKS

1342

Will show its EditDroid computer editing system. Appearing for the first time at SMPTE will be SoundDroid, a digital audio signal processing system.

DUBNER COMPUTER SYSTEMS

516

Will introduce a brand-new still store system that can tie in with the company's paint system. Also new will be the SPOT computer automated break tape system. The DPS-1 paint system will be on hand with the 10K and 20K character generators, all introduced at NAB. Regular equipment will be the CGB-2 graphics animation system and the Texta character generator/graphics system.

DYNAIR ELECTRONICS

116

Will bring its I Series family of controllers, which debuted at NAB. This includes the PCA-900A alphanumeric control and PCA-904A 21-key control, both of which are controllers for switchers and machine controllers. The regular line will be represented by the System 23 machine control system, 25 Series routing switcher, and System 21 routing switcher.

EASTMAN KODAK CO.

525

A new product will be announced at the show; definite products are the film and video company's active lines of instant picture films, its full line of professional videotapes, and Instagraphic slide and print products.

ECHOLAB

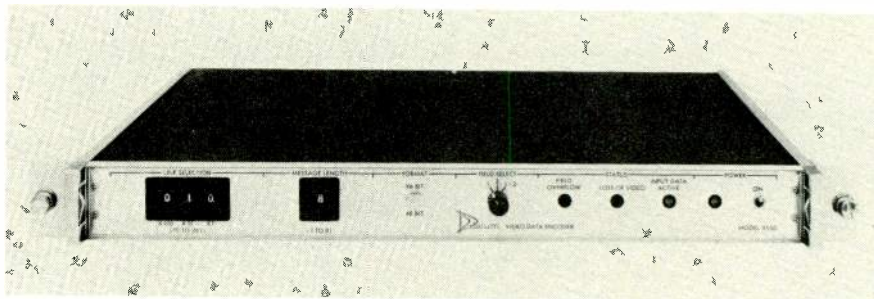
1416

Will show two products introduced at NAB: the SE/6, a large front-panel version of the SE/3 special effects generator; and the DSF broadcast-quality digital effects unit. Other products will include the SE/3, with 10 inputs and built-in memory for 5000 events, and the SE-1G special effects generator for new low-end genlockable cameras.

EECO

1052

Will feature the EMME videotape editing system with Video Editing and Cinemagraphic workstations; the IVES



Datum's 9550 video data encoder.

three-machine editing system with A/B option; and still-frame audio for inter-active videodiscs.

EEV

1309

Will present the P8474 2/3-inch mixed field Leddicon lead-oxide camera pickup tube, introduced at NAB for such new ENG/EFP cameras as the Sony BVP-30 and BVP-360, as well as the P8164 2/3-inch hybrid Leddicon for the JVC KY-320E, Hitachi FP-22, and similar cameras. The established line includes Leddicon and Vidison pickup tubes for broadcast TV cameras.

ELECON (UNIVERSAL)

702

Will probably display an MTS stereo generator and demodulator by Eiden Co., along with its own EM 7100 Series editing system. Also on hand will be its U.VAS video and audio synchronizer system, and line of battery packs.

ESE

1000

Will show its established line of digital clocks and timers, master clock systems, programmable clocks and timers, time code readers, generators, and comparators, time calculators, and video DAs.

EVENTIDE

900

Will introduce the following new software for its SP2016 audio effects processor/reverb: vocoder program; automatic panner; reverse, nonlinear, and gated programs. Also present, for the first time at SMPTE, will be the 969 Harmonizer, a multipurpose effects unit with pitch change and other features. Also to be shown are the 949 Harmonizer, with pitch change and effects, which can be used with most audio recorders for time compression, and the Timesqueeze Jr. system for audio time compression for film and video.

EVERTZ MICROSYSTEMS

806

Will present a new line of synchroniz-

ers, including the Emulator, for multitrack audio for editing systems, and the Chaser, a chase synchronizer. Established products will include the line of LTC and VITC time code equipment, and the line of EV-Bloc circuit modules for post-production and broadcast, including time code generators and readers, transport controllers, and character generators.

FAROUDJA LABORATORIES

1648

Will bring its line of video noise reducers, image enhancers, color correctors, decoders, and comb filters.

FOR-A CORP.

742

Will introduce the following products to SMPTE: the FA-440 digital effects TBC, offering compression, horizontal and vertical mosaics, inversion, mirror-image, horizontal and vertical splits, and color image; the FA-450 component TBC; CVM-500 component video mixer or switcher; the ENC-110 color encoder. Regular line will include the FA-400/420 digital TBCs with freeze frame, FA-410 digital TBC, FA-430 digital TBC with image enhancement and color correction, CCS-4300 broadcast color corrector, DEC-100 RGB decoder, and VTW-400 video typewriter. For-A is also the sole U.S. distributor of equipment for U.K.-based System Video Ltd., including microprocessor-based waveform monitors, vectorscopes, and signal generators.

FORTEL

106

Will bring its TBC line, Models CCDY/C, TBC32, and TBC32 HET. Other products will be the Colorex chroma noise reducer, DP/G corrector for correcting differential phase and gain errors, and the Y688 total error corrector, a TBC with added image processing.

FOSTEX CORP.

1707

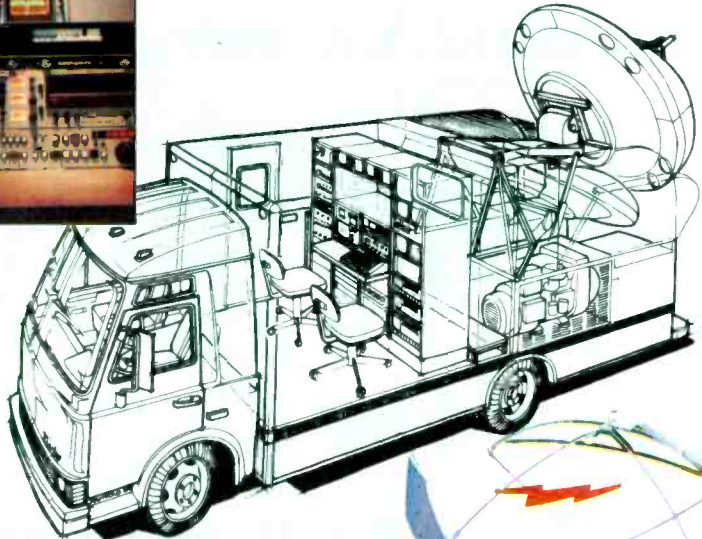
For its first SMPTE exhibition ever, Fostex will introduce a new eight-track

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SLIM & POWERFUL.

A FULL FEATURE BROADCAST PERFORMANCE TBC

FEATURES

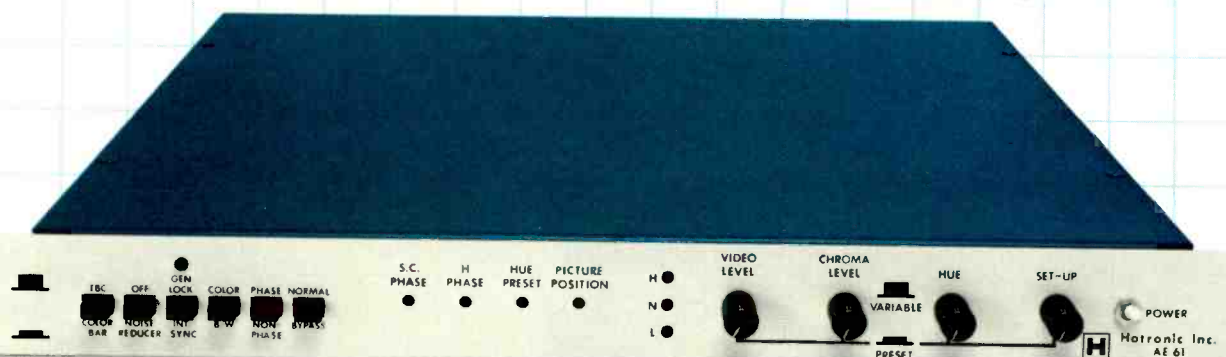
- Time base correction for Heterodyne VTRs.
- Constant H phase for matched frame edit.
- 4 times sub-carrier sampling, 8 bit resolution.
- 16 line window.
- Absolutely transparent.
- Operates with or without VTR 3.58 MHz sub-carrier feedback.
- Adjustable horizontal and vertical blanking.
- Handle high speed search.
- Full processing amplifier control.
- 1 3/4 inches height, less than 15 lb.

OPTIONS

- Noise reducer.
- Digital SMPTE Color Bar
- Station Identification.
- Digital pixel by pixel Drop out compensator.

The HOTRONIC AE61 upholds the standards of performance and easy operation that so many TBC users demand. While paring size and weight to the barest possible minimum, it does not sacrifice the rigid Hotronic standards of reliability and longevity. This product is not merely transparently *respectable*. It is transparently *superb*! The AE61 is custom-designed for the increasingly quality-conscious world of the 80s. The demand for quality in the 80s has *sharpened* the character of the AE61 — the standards of Hotronic have *formed* it!

THE HOTRONIC AE61.



HOTRONIC, INC.

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TEL: (408) 292-1176

ATR with synchronizer port, a new two-track stereo machine with center track SMPTE time code, a new MIDI to SMPTE synchronizer, as well as its regular time code synchronizer for audio or video, and a new 8x4x2 mixing board. Stereo mics and near field studio monitor speakers, introduced at NAB, will be exhibited, as will Fostex's regular line of signal processing gear and the B-16 16-track recorder, synchronizer-ready.

FREZZOLINI 434

Will unveil a new Frezzi Multiple Mini Fill lighting kit, which uses 100 W lamps for low heat continuous location lighting; includes three Mini-Fills, dichroic filters, and a four-output Frezzi ac power supply. List price is about \$1000; optional adapter cables for 12-14 V dc operation. Plus the complete line of ENG/EFP power packs, chargers, multiple charging stations, on-board ac power supplies, portable lighting systems, and Mini-Fill light heads.

FUJINON 142

Will present its line of lenses and lens remote control, which include the NAB-introduced f/1.2 version of its A44X9.5ESM 44X zoom for 2/3-inch cameras, also in an f/1.4 version weighing just 14.6 kg; the P20x14 extra wide angle studio lens for 1/4-inch cameras; and an economical 16xENG zoom with wide angle of 9.5 mm and f/1.8 maximum aperture.

FUJI PHOTO FILM USA 312

Brand-new will be H621E one-inch videotape, along with the two tapes introduced at NAB: H321B, Betacam half-inch tape with increased audio capacity, and H421M, M-format half-inch VHS tape. The H521BR, 3/4-inch videocassettes, will be highlighted from the existing tape lines.

GENERAL ELECTRIC 1109

Will present its complete line of Quartzline and incandescent lamps for production lighting, including Watt-Miser Quartzline lamps for TV and motion picture production.

ALAN GORDON 1730

Will introduce the FAX/EOS single-frame video animation control unit. Also will show the Image 300 35 mm high-speed camera system; Mignon 35 mm portable projector; Imerect 500 and 925 prisms; Mini Moy 12-inch geared camera head; the new lightweight Pro-

Legs tripod; the Senior, Junior and Mini animation stands; FAX artists discs and supplies; 575 W Meteor, 1200 W Comet, and 2500 W Super Star HMI lighting systems.

GOTHAM AUDIO 1808 CORP.

Will emphasize Neumann shotgun microphones, Models KMR 81 and 82. Regular Neumann studio mics will also be shown.

GRAHAM-PATTEN 1709 SYSTEMS

Will highlight edit suite audio mixers, especially its 16-input mixer with equalizer which was introduced at NAB, programmable equalizers for both 12- and 16-input mixers, which can be retrofitted to existing Graham-Patten mixers, and downstream keyers. The complete line of audio and video DAs will be shown, and the company will be offering custom design of audio and video DA systems, remote-control DAs, and transmitter remote control.



Denecke's TC-1 time code reader.

GRASS VALLEY 512 GROUP

Can be expected to exhibit its line of switching and distribution equipment including the Models 100 and 1680 video production switchers, Model 100CV analog component production switcher, 300/DVE video production system, Horizon and Ten-X routing switchers, 4S-M200 master control automation, Wavelink fiberoptics transmission system, 3250 Series sync generators, 3200 Series video processing equipment, the line of signal distribution equipment, AMX100 post-production audio mixer, and perhaps the experimental HDTV production switcher demonstrated at NAB.

GRAY ENGINEERING 652 LABS

May have in production by SMPTE its new DT 213 time code data transmitter and dual character generator, and the FC-142 film counter character generator. Will show the established lines of SMPTE time code transmitters and readers, VITC readers and generators, video reticule generators, and video-assisted film editing products.

JAMES GRUNDER 1543

Will introduce to SMPTE the TBC/frame store synchronizer with special effects, shown in prototype in its suite at NAB. This consists of a P12730 mainframe for special effects and offers border color generation. Also appearing at this show for the first time will be the P148 special effects box, the P152 controller labelled "Morris," which is a universal controller with built-in seven-inch touchscreen. All are expected to be in production by SMPTE. A new comb filter option for existing units and the P14720 and 14730 will provide 4.2 MHz bandwidth, horizontal and vertical enhancement, and noise reduction. The company will also be selling Brabury Ltd. 14- and 20-inch monitors with over 500 lines of resolution.

GTE LIGHTING 1020 PRODUCTS

Will feature its line of Sylvania lamps.

HARRIS BROADCAST 938 DIV.

Completely new will be a signal processing box for broadcast and industrial applications; more details will be available at the show. A graphics interface for IRIS and Aurora will also be introduced. Established products will include the DVE 200 digital video effects system; IRIS/Aurora graphics/paint/still store system; and the 5400 and 5500 family of signal processors and TBC products with verifiable tracking feature (at a major price reduction). Also the Phase 6 audio device for keeping left and right audio channels in proper phasing, which debuted at NAB. Microwave equipment will also be on hand.

HARRISON SYSTEMS 1134

Will premiere the new 10 Series console, described by the company as the world's first totally automated and dynamically resettable console. A sampling from the existing range of audio consoles will also be on hand.

HEDCO 707

Will unveil the Model HD-12 12x12 routing switcher, which is controlled internally with RS-232 and RS-422/RS 485; it occupies two rack units. New to SMPTE will be the general purpose switcher control, nicknamed the PUP for practically universal processor, which will switch any HEDCO switcher by way of modem, local computer, or dumb terminal. The regular lines of

routing switchers, video and audio distribution equipment will also be shown.

KARL HEITZ, INC. 1737
Will bring the Gitzo 564LM microphone fishbowl in the five-section model that ranges from one and a half to seven feet, and a six-section version that extends to eight feet. Also present will be the Gitzo mono tripod with a built-in monopod in one leg; Gitzo 580/680 100 percent fluid heads with adjustable counterbalance for cameras up to 50 or 100 pounds; Gitzo Levelling Ball 3 for Studex with rapid shift or gearlift column; Levelling Ball 6F with flat base; and the portable Kinoptik mini-collimator, with 274 mm lens.

HITACHI DENSHI 816
Will introduce the SK110D studio camera with full automatic setup of RGB, automatic analog and digital registration (DRC), real-time lens correction, and 30 mm LLC diode gun Plumbicon. Regular products will consist of the SK-97 ENG camera, SK-970 studio camera, HR-230 one-inch VTR, and Z-31 low-cost camera.

HM ELECTRONICS 1934
New equipment will include the System 87, a handheld mic with Shure SM67 mic element, and a preview of the BH 720 belt pack cabled intercom with one and two channels, the latter over a four-wire cable. The standard lines of wireless mics, intercoms, and cabled intercoms will be present.

HOTRONIC 128
Will show its AE 61 time base corrector and AD 51 TBC/frame synchronizer, with options including digital dropout compensation and digital SMPTE color bar.

IKEGAMI 1412
Will bring its updated 9 Series monitors and the TKC 990 telecine system. From its extensive camera line, the HL-95 and HL-79E ENG cameras will be shown, as will the HK-357 and 322 studio cameras, SC-500 studio camera, and the SC-730A and 730AP small studio/broadcast color cameras. Also plans to show its HDTV equipment.

IMAGE VIDEO 502
Will bring several products unveiled at NAB, including a master control automation system, a component routing switcher, a stereo master control switcher, and a video/stereo audio routing switcher. Established products

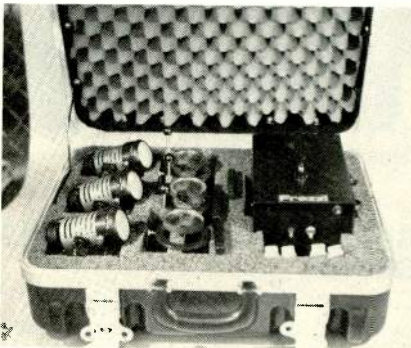
include the line of component video switchers, AFV switchers with built-in power supplies, master control switchers, the VMP-1 voltage monitor, and the 8105 border generator with downstream keyer.

INNOVATIVE TELEVISION EQUIPMENT 1642

The P-8 portable field pedestal will be added to the existing line of support equipment, which will be represented by the P-1 pneumatic pedestal, H-100 Hydrocam head, H-16 fluid head on a T-12 tripod, and the System 40 tripod and fluid head.

INTERACTIVE MOTION CONTROL 1609

Will introduce its Video Aerial Image System for converting 35 mm and 2 1/4-inch slides to video; and the Integrated Video Products Stage, a scaled-down stage for shooting products in video, with nodal point pan/tilt head. The 3536 motion control computer will also be available.



Frezzi Mini-Fill lighting kit.

INTERGROUP VIDEO SYSTEMS 1906

Will bring the new 8001 Mini Master Control, an eight-output master control switcher seen in prototype already but with new features, which include serial interface capability, fade/take, take/fade, and cut transitions, and three audio breakaway inputs, all for under \$8000. Also new will be the 16x1 video-only routing switcher, a single rack unit with inputs that has been designed as an input device for the new boxes. Cost is under \$1000. Existing equipment will be the 903 Series production switchers, 904 Series production switchers, and 899 master control switchers.

JAVELIN ELECTRONICS 930
Will present items from its line of CCD, monochrome, and color cameras; camera lenses and extenders; video

DAs; monitors; and remote pan and tilt systems.

JVC CO. OF AMERICA 930

Will unveil a line of 3/4-inch tape, and JVC's first TBC, the SAT100U. The CR-8500 front loading 3/4-inch VCR will be on hand; it was previewed at NAB and is expected to be ready for delivery by SMPTE. Other products will be the Procama Series three-tube cameras, with emphasis on 3/4-inch equipment.

K&H PRODUCTS/PORTABRACE 1502

Will have the line of nylon cases for all Betacam systems, premiered at NAB, plus a new recorder case for the Sony VO-6800 added to its line of recorder, camera, and general purpose ENG/EFP cases.

KINTEK 1923

Will introduce the brand-new Monogard, an automatic monitor to indicate reverse polarity and automatically switch it if desired. The KT 903 stereo synthesizer, introduced at NAB, will also be shown.

LAIRD TELEMEDIA 1252

Will premiere the Model 1500 character generator. From its regular line, the Athena telecine, Model 4320 slide projector with dual drums, and 5050 automatic light control will be present.

LAKE SYSTEMS CORP. 1140

Will premiere the new dual-channel La-Kart station automation system with multichannel, all source to all destination capability. Other features are multiple formats (half-inch Beta and M-format, 3/4-inch U-Matic, and one-inch Type-C), multiple segments per tape, component processing or NTSC, on-line editing, auto-preview, manual recue, and a new catalog sort of events.

LEITCH VIDEO LTD. 1742

Will present its CSD 5300 master clock; DAC intelligent clocks; VPA 331 video processing amplifier; audio and video DAs; SCH 731 phase monitor; DTG Series test signal generators; and audio and video switchers.

LENCO 1517

Will introduce a new TBC, the TBC-490, with pixel-by-pixel DOC, constant H phase for matched frame edits, and eight-bit resolution; it comes

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in a 1 3/4-inch rack configuration. The new PAL videoscope, Model PVS-435P, measures the SC/H condition of any standard PAL color video signal. Established products to be exhibited are video/audio terminal equipment; RS170-A sync, black-burst, color bar, multiburst and staircase ramp generators; NTSC encoders and decoders; video delay amps; video and audio DAs; pulse and subcarriers amps; monitors; 199 W stereo power amp; video noise meter; and the Videoscope.

LEXICON 212

Will highlight its stereo time compressor/expander, the 1200C/S. Also to be shown are the Model 1300 stereo digital audio delay synchronizer; low-cost PCM-60 digital reverb; Model 200 digital reverb/room simulator; 224XL digital reverb/effects processor with LARC; and PCM 41 and 42 digital delay lines.

LIPSNER-SMITH CO. 316

Will display its line of ultrasonic film cleaning equipment.

LISTEC TELEVISION EQUIPMENT CORP. 642

Will introduce to SMPTE a 19-inch on-camera studio prompting system with wide angle mirror and hood, and the A-2100 dedicated computer prompter including QWERTY keyboard, with all word processing commands in English and up to 1.5 hours air time on a 5 1/4-inch floppy disk. Also new will be the A-4000 Series portable studio/field prompters with 1.5X Magnifier system and nine-inch on-camera system below the lens. Other new products will be the Polar Video product line consisting of the PVM-1 video production switcher, weighing seven pounds, 120 V ac or 12 V dc power; PPM-1 Picture Mover, an analog video processing device allowing a range of picture locations; PAF-1 Auto Fade Unit for preprogrammed fades from shot to shot. Additionally, the full line of Vinten camera mounting equipment will be featured.

LOWEL-LIGHT MFG. 913

Will have a full line of lighting equipment for film, video, and still photography.

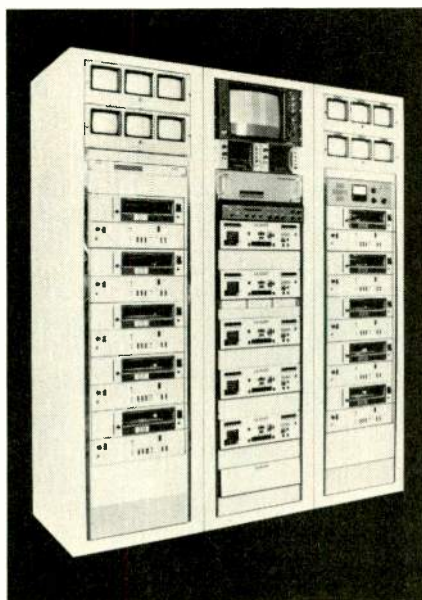
LTM CORP. OF AMERICA 1312

Will feature the Cinepar 200, a 200 W HMI; Pepper Packs, portable, professional lighting kits using fresnels; a line

of studio incandescent fresnel fixtures from 1000 W to 10 kW; the A230 six-channel sound mixer; and a 12 kW Luxarc focusing fresnel HMI light. The company will also show its large selection of HMIs and its Pepper miniature quartz-halogen lights.

3M BROADCASTING AND RELATED PRODUCTS DIV. 120

Will emphasize the 3M/Artronic studio graphics system in two versions, the 8x24 Imagegrab system, and the standard 8x24 system. Other spotlighted equipment will be the D-5000 graphic arts character generator, D-1512 character generator system, and the H Series audio/video routing switching system with several new control panels.



Lake's multichannel La-Kart.

3M MAGNETIC AUDIO/VIDEO PRODUCTS DIV. 120

Will unwrap a new brand of digital video mastering tape, Scotch 275, which will be available in 1/4-, half-, and one-inch widths in 10.5- and 12.5-inch reels. The Snap-Cap Hanger system will be a new kind of storage system for all types of videocassettes, Beta, VHS, mini, and maxi. Other products on hand, which were introduced earlier this year, will be Scotch MBR master broadcast U-Matic videotape; Scotch Broadcast half-inch videocassettes; BC/Broadcast half-inch videocassettes; Cinetrack magnetic film; 480 one-inch mastering videotape; and 226 and 250 audio mastering tapes.

M/A-COM MAC 1349

Will highlight its SNG package, a low-

cost satellite newsgathering vehicle, Ku-band. It will also have on hand its MIC central receiver, Super 2MX lightweight, portable microwave transmitter for ENG, and Skypod.

MAGNA-TECH ELECTRONIC 234

Will present products from its line of sprocketed magnetic film transports and dubbers, film/video synchronizers, and time code reader/generators.

MAGNI SYSTEMS 306

Will release two new products, the 1520/1525 Integrated Measurement Package (IMP), and the 2015 Personal Computer Aided Television Synthesizer (PCATS). The first is a waveform monitor and vectorscope with test signal generator in one package and an AUTO "signal follows measurement" mode in which the signal generator provides the signal usually associated with a monitoring mode.

The 2015 PCATS is used with IBM PC-compatible Signal Master Editor software package, which helps define test signal parameters and programs the PCATS for conversion to both analog and digital signals. Signals from 525/60 NTSC to 1125/60 HDTV and beyond are possible along with selectable clock frequencies for compatibility with standard digital sampling frequencies.

MAG-ZON 1503

Will have its line of audio magnetic tape.

MATTHEWS STUDIO EQUIPMENT 935

Will bring items from its complete line of cranes, dollies, track, stands, lighting control and diffusion, mounting and grip equipment, and remote camera heads and controls. Recently introduced products include the Doorway Dolly, Car Mount, Side Mount, scrim bags, grid clamp, Matth gag, Matth quad, Cam-Remote sports version, Cam-Remote one-operator console, Cam-Remote snorkel, Turtle stand, collapsible C-stand, focus track, Tulip cowling and seats, point of ladder pin, Matth poles, Stage Stands, Flex-Clamp, adapter kit, collapsible stand extension, and heat resistor umbrella.

MAXELL CORP. OF AMERICA 705

Will show its lines of professional audio cassettes and HGX professional half-inch tape, 3/4-inch videocassettes.

"Small market stations can expect the performance/price ratio to make the SC-500 a solid investment."

— David Hooge, Chief Engineer KEYC, Mankato, Minnesota

Ikegami introduces the studio/field camera for users who want Ikegami quality at a modest price: the SC-500, Saticon II® tube camera.

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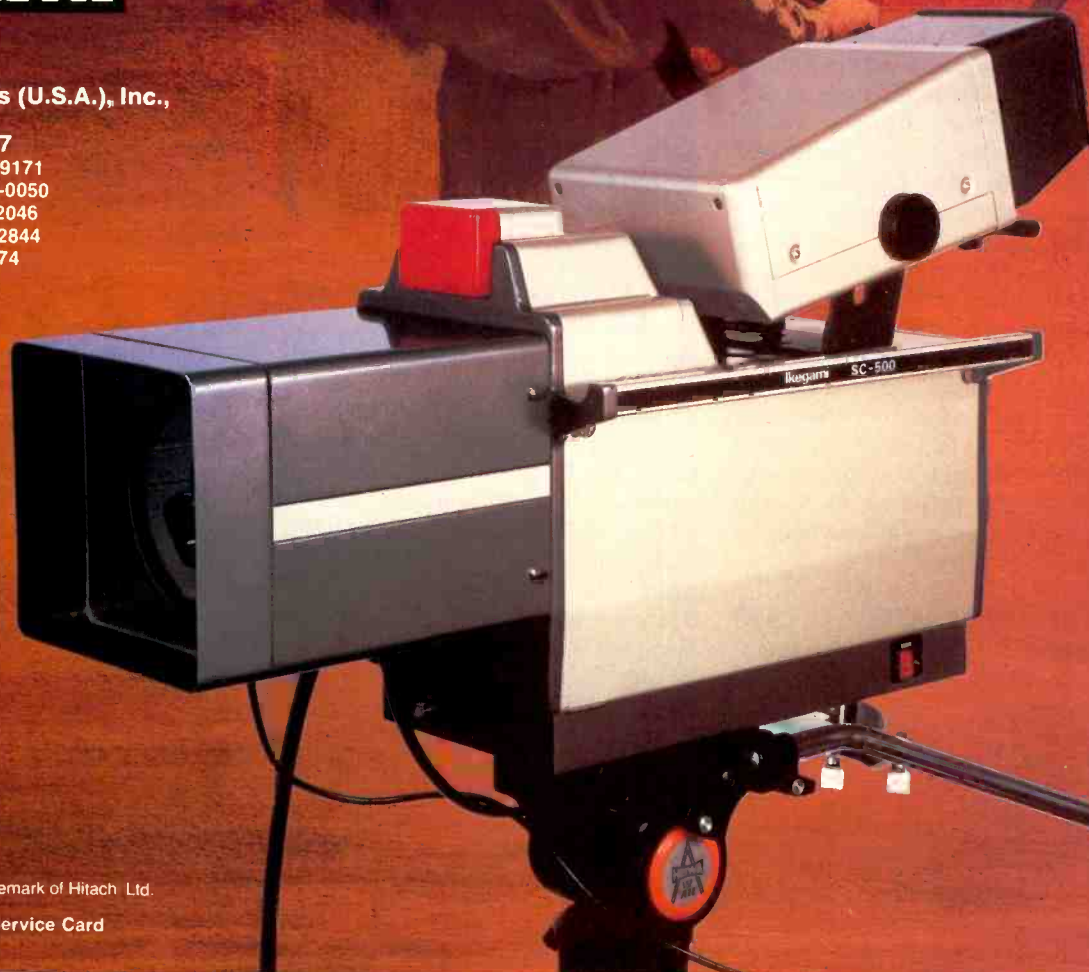
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MERLIN ENGINEERING 1116 WORKS

Will debut a new digital effects system, details to be revealed at the show. Also new will be Vertical Interval Stereo Audio or VISA. In addition, Merlin will show the GEC McMichael telecine for the first time.

MICRON AUDIO PRODUCTS 902

Will introduce the CTR501, a new pocket transmitter, and the MR501 mobile receiver, both with complimentary noise suppression. Regular products from the lines of handheld and modular multichannel diversity receivers, single-channel portable to multichannel modular systems, will also be present.

MICROTIME 535

Will display the Genesis I programmable digital effects system with the ACT-1 controller, introduced at NAB, which offers joystick positioning and frame-accurate specification of effect length. The T-220 FIT, format interchange TBC will be shown.

MIDWEST CORP. 552

Will be talking about its S-20 SNG vehicle for Ku-band satellite transmissions, first seen at NAB, and its general line of ENG vehicles and larger mobile teleproduction vehicles.

MOLE-RICHARDSON CO. 1525

Will bring its dimmers, fresnels, HMI fixtures, Solarspots, softlights, lighting kits, cyc strips, quartz lights, and grip equipment. Recent additions include the 4271 Molemote Molepar, 2981 mini softlight, 5321 2.5K dc Molelectronic dimmer, 5361 ac to dc Molelectronic dimmer, 2901 two-inch Tiny-Mole Solarspot, 6281A 6000 W HMI Mole Solar-Arc, and the 4811 Baby Size low compact lightweight stand.

MONTAGE COMPUTER CORP. 1248

Will demonstrate the Montage Picture Cutter, a computer-controlled, film-style video editing system that allows change of editorial decisions at random.

MULTI-TRACK MAGNETICS 438

Will have its 106-DCS-10 high-speed sound follower for any telecine projector, and film-to-video interface system.

NAGRA MAGNETIC RECORDERS 1207

Will show its 4S Time Code (TATC) portable recorder and T-Audio Time Code recorder for post-production, both with center stripe SMPTE time code.

NEC AMERICA BROADCAST EQUIPMENT DIV. 1120

Will have the production version of the the DVE System 10 special effects unit, which was shown in prototype at NAB. From its other lines of video equipment the SP3A CCD camera will be shown.

NEUMADE PRODUCTS 912

Will present samples of its empty videotape reels, carts and cases; videotape loaders, timers and rewinders; and Neuvator II film cleaners.



The Montage Picture Processor.

RUPERT NEVE, INC. 345

Will highlight its NECAM 96 computer automated audio mixing system with automated and group muting and real-time control and displays. Also in the exhibit will be the 8128 Series multitrack console with microprocessor-controlled central assignment, in-line monitoring, and two signal paths; the 542 Series video editing/post-production consoles, eight to 16 inputs, mono or stereo.

NISUS NA

Will emphasize its shutter-modified

video cameras, for stop action and motion analysis, including the N-79E based on Ikegami's HL-79E, and the N-3A, an auto setup, three-tube camera. A modified CCD camera, the CCD-1000 with new, more rugged housing and external sync, and a specialized lens for astronomy may be shown.

NORTH AMERICAN PHILIPS LIGHTING 1816

Will spotlight its lamps, HMI and CSI fixtures, quartz fixtures, and cyc lighting.

NOVA SYSTEMS 1652

Will unveil a new TBC, the 620, details to be announced. The 490 heterodyne-only TBC will also be present with the 500 direct-only TBC, and 510 direct/heterodyne TBC.

NOVOMAGNETICS 1712

Will show its complete line of magnetic audio film.

NURAD 1006

Will show several products introduced last spring, such as the SQ6 Series receive antenna system, a six-foot version of Superquad II with quad polarization, high gain, and low sidelobes; 130CT1 compact 22-channel 13 GHz transmitter; 130OR1 14.5+ compact parabolic antenna; 20CT1 compact transmitter and 20PA15(A) mast-mounted power amp, both for 2 GHz applications; Logic-Track helicopter automatic tracking receive system; 20CA1 compact antenna; Supertrack automatic tracking system, 2.5 and 2 GHz; AT Series frequency-agile transmitters in 2, 2.5, 6, 7, and 13 GHz; 130AR2 13 GHz frequency-agile receiver; and AP2 Series central ENG/EJ receivers with improved audio S/N and adjacent channel rejection.

The Superquad II, Silhouette, and quad receive antenna systems will also be presented along with the Silhouette remote transmit systems and PT and RX Series portable transmitters and receivers; SuperPod airborne microwave system; STL/ICR systems with antennas, FT2 Series transmitters, FR2 Series receivers, and H/S Series hot standby units.

O'CONNOR ENGINEERING LABS 1535

Will introduce its first all-metal tripod, the Model 155 Metal. Also will highlight from its complete line of camera support systems for any size or weight

TECHNICAL AND EXHIBIT PROGRAM

Monday—October 28

A.M.

- Conference Opening: Welcoming address by SMPTE president Harold Eady, Novo Communications, Inc.

- Engineering Report: SMPTE Engineering VP Richard G. Streeter, CBS Broadcast Group

- Guest Speaker: Wilbur J. Prezzano, Group VP, Eastmak Kodak Co., "Changing Times... Unchanging Values"

P.M.

- Honors and Awards Luncheon Personal Computer Applications Film & Lab Technology I 2:00-8:00 Exhibit hall open

Tuesday—October 29

A.M.

Film Camera and Projections Systems

Film & Lab Technology II 10:00-6:00 Exhibit hall open

P.M.

Film & Television Production I

Wednesday—October 30

A.M.

Digital Audio Applications Film & Television Production II 10:00-6:00 Exhibit hall open

P.M.

Video Transmission and Processing Systems

Thursday—October 31

A.M.

Electronic Graphics Multichannel TV Sound 10:00-4:00 Exhibit hall open

P.M.

High-Definition Television (with Panel Discussion)

Video Post-Production & Editing

Friday—November 1

A.M.

Television Cameras Television Systems

P.M.

Video Recording

which are used in Skycam; the AS-6100 special effects generator; the chromakey generator, Model AS-200; and the AS-100 color sync generator. From the monitor line will be the 19 and 13-inch color monitors.

PERROTT ENGINEERING LABS 1736

Will bring its full line of nicad, silver-zinc, and lead-acid power systems, some of which will be shown on the newer, lighter cameras.

PHILIPS TELEVISION SYSTEMS 138

Will show a new LDK 7020 20-inch monitor featuring a high-resolution CRT. Also shown will be the LDK 6, 25, or 30 mm studio camera; LDK 26 family of 18 mm automatic cameras with total computer control; LDK 614 triax portable camera; the latest generation of LDK 54 recorder/camera; and two monitors, the LDH 6220, 20-inch monitor and LDH-6200, 14-inch color monitor.

Philips will also have on hand its sync pulse generator, comb filter, and pro CD system.

PLASTIC REEL CORP. 500

Will present its complete line of videotape reels, including an anti-static reel, and videocassette containers, plus Beta, VHS, and 3/4-inch videotape.

Q-TV 844

Will introduce expanded memory capability for the VPS 500-II computer prompter and will show its regular line of teleprompters, including the Mini Q on-location prompter.

QUAD-EIGHT/WESTREX 1320

Will bring the Superstar console, a 20-bit analog console designed specifically for digital recording; it sports 64 mixing buses and can record with two 32-track ATRs, including the Mitsubishi X850 32-channel PCM recorder. Other items will be the Compu-mix 4, a 32-bit master processing computer that records on an 80-Mbyte Winchester hard disk in real-time, and the Intelligent Digital Fader with its own microprocessor. The Mitsubishi X-86 two-track PCM digital ATR will also be exhibited.

QUANTA CORP. 542

Will show the EVP 850 paint system, dual-channel Quantafont Q-8, and the QCG 500 character generator, all with

camera the Model 100HD heavy-duty fluid head, a new version of the 100C, which O'Connor premiered at NAB.

OPTECH 1932

Will display its line of HMI lights for rent, including a new 12K dayburst.

OSRAM CORP. 1316

Will showcase its HMI lamps and lighting fixtures.

OTARI 309

Will have on hand the MTR-20 open-reel multichannel ATR, shown in prototype last year. Also available will be the CB-120 auto-locator for the MTR-20, capable of time code.

PAG AMERICA 1824

The recently established distributor of PAG, Ltd. of England will market the Speedcharge 6000, a microprocessor-controlled battery charger that automatically gives the right charge to nicad and some lead-acid batteries via fast or slow charge. The Speedcharge also can revitalize poor batteries and detects faulty batteries. The Sequencer 6000 can charge up to eight nicad batteries or

belts with the Speedcharge; Pagclip 90 and a PAG PP90 battery can act as replacement for Sony BP-90s and attaches directly to ENG cameras; various PAGPAC batteries will also be shown.

PALTEX 538

Will feature its computerized videotape editing equipment and digital processors. Esprit, a five-VTR edit controller with up to 14,000 lines of edit list memory, was introduced at NAB along with the Gemini eight-bit digital video processor, which features advanced 4:2:2 component sampling techniques for fully framed, digitally processed, stable color video output.

PANASONIC INDUSTRIAL 909

Will present its entire line of M-format recorders and editing equipment; the MVP-100 multifunction video player; the AK-30 camera, primarily for ENG; the AU-220 M-format portable VTR; Recam editing equipment, including the AU-300B editing recorder and the AU-A30 controller; the Recam one-piece recorder/cameras AK-100P Plumbicon and AK-100S Saticon,

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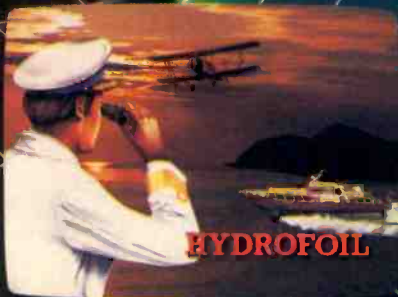
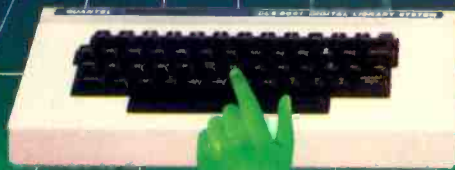
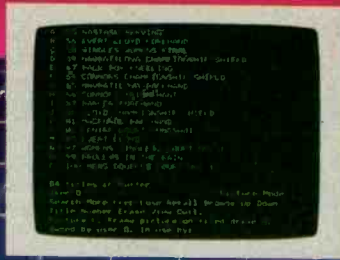


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software that has been modified and improved since NAB.

QUANTEL 1220
Will bring the 6030 Digital Library system, a digital still store and central lending library. Paint Box with the Perspective option, and the Cypher digital caption generator.

RAMSA (PANASONIC PRO AUDIO) 909
Will exhibit its WR-8616 post-production audio mixing console along with some Panasonic video equipment to show a typical version of its post-production setup in operation. Also present will be the WP-9210 power amp; WS-A70 studio monitor speakers; WZ-932 1/3-octave equalizer; and the WR-S208 stereo audio mixer.

RANK CINTEL 922, 924
Will introduce to SMPTE the MK3 high-definition flying spot scanner for the 1125-line, 60 Hz standard. The Mark MK3 C Flying Spot telecine, the current model with variable speed and X,Y zoom, will also be on hand with the ADS-1 CCD telecine, Amigo

telecine control computer for preprogrammed scene-by-scene color correction, Ferrit dubber, and Slide File still store.

RCA BROADCAST SYSTEMS DIV. 112
Will show the TCR-500 Silverlake Video Cartridge system, an M-format multicassette system designed as a replacement for current quad cart machines to automate the airing of commercials and program material. RCA will also be demonstrating its CCD-1 cameras, which include the CCD-1S sports version of the solid-state camera.

REAL WORLD TECHNOLOGIES 1303
Will have equipment from its selection of UniVUer VU and PPM meters, video monitor audio level displays, safe title area generators, and the Univiewer and MonSter mono/stereo coherence evaluator.

RECORTEC 1936
Will demonstrate two videotape models from its line of tape cleaner/

evaluators, the VTE 102 for 90-minute reels and the VTE 103 for three-hour reels.

RESEARCH TECHNOLOGY INTL. (RTI) 416
Will present several products introduced at NAB: TapeChek 6120, a new one-inch evaluator/cleaner that detects and displays tape defects in color with over 20X speed; TapeChek 320 for inspecting and cleaning all VHS tape; the VT Series evaluators/cleaners for 3/4-inch, Beta, and VHS formats. Also the TV-2000 for one operation film pre-viewing, editing, inspecting, and cleaning, and a table-top 16 mm film viewer, CineScan.

ROSCO LABORATORIES 1049
Will show its range of precise chromakey and Ultimatte paints. Also exhibiting scenery materials, props, and color and diffusion filters for light, patterns, and specialized TV paints and scenic materials.

ROSS VIDEO 1931
Will bring its Model RUS-210 produc-

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duction system, introduced at NAB; using Eurocard-style cassettes and a modular mainframe arrangement, it offers new audio control architecture, stereo and dual-language feeds, eight to 64 mono or stereo input channels and 12 other stereo mix buses, electronic switching and SSL's optional computer-based Instant Reset, Total Recall, for floppy disk storage, and SSL Studio, for machine and synchronizer control. The 6000 E Series stereo video system can accept up to 56 input/output modules with three stereo mix buses for stereo music, dialog, and effects feeds. Options to both series include the Programmable Equalizer for two three-band parametric equalizers and pan pots, the Real-Time system for executing complex sequences from one set of controls, and the Integral Synchronizer and Master Transport Selector for manual or computer control of up to five transports.

SONY PRO AUDIO DIV. 530
Will introduce a new broadcast console. Also on hand will be the APR 5003 time code recorder, TCD-5 pro recorder, APR-2003 two-track, open-

reel field recorder, its lines of mics and mixers including the lavalier series and ultra-miniature ECM-77 introduced at NAB, and the AVS-500 Sync Master, a time-code based synchronizer.

SONY BROADCAST PRODUCTS 530

Will unveil a new 14-inch monitor, the BVM 1310/1410, and a new BSBX-100 3x1 routing switcher. Sony introduced a BVP-3A Betacam camera at NAB as well as the BVW-15 dynamic tracking player, and improvements to the high-definition video system. The stereo audio production/post-production system was seen interfaced with broadcast one-inch Type-C machines, and the BVH-2500 Delta time lapse VTR for still frame animation and videodisc applications was also shown, as was the BVH-2700 and BVP-3000 Super Motion video system.

SONY INDUSTRIAL TAPE 530

Will bring out two new tapes, V1-K one-inch C-format tape, and BCT tape for Betacams and Betacarts.

SOUNDCRAFT ELECTRONICS 1938

Will add to its lines of consoles a new broadcast production console, the TV24, the 200 B

SOUND TECHNOLOGY 1706

Will exhibit the 3000 Series programmable transmission/audio test system, which is equipped with an RS-232 interface bus.

STANTRON 1718

Will present its line of video cabinets, racks, and consoles for production and post-production facilities.

STEENBECK 1130

Will show items from its selection of flatbed film editors, including a flatbed table with U-Matic transport for video sound editing; the ST 201V Video Reporter, first seen at NAB, which combines a videocassette machine with an electronic control and synchronizing system; and the ST 1B 35 mm film-to-tape transfer unit.

STRAND CENTURY 735

Will present its complete line of

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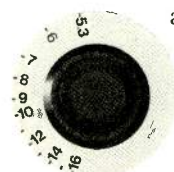
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Potomac has developed the SMR-11 Synthesized Monitor Receiver which will let you hear and measure the quality of your transmitted AM signal ... perhaps for the first time. Features include: Crystal Stability; 60 dB Signal to Noise Ratio; Audio Frequency Response ± 0.5 dB, 20 Hz to 8 kHz; Total Harmonic Distortion less than 0.2% (95% Modulation) at audio frequencies above 40 Hz ... please write for complete descriptive brochure.



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dimming and control systems and fixtures, HMI solid-state ballasts, and Par lights, including the Shaulea 575 W HMI open-faced fixture introduced at NAB along with a line of softlights and a 12K HMI fresnel.

STUDER REVOX AMERICA 1740

Will bring out a new audio recorder, the A820-TC, with 14-inch reel capacity, and new pilot tone versions of the A810 stereo audio recorder for film audio. The 169/269 compact mixing consoles for video editing and post-production will also be there.

SWINTEK ENTERPRISES 1807

Will introduce the Mark QDC dual-frequency receiver for video or film cameras as well as showing its existing lines of radio headsets, intercoms, and monitors.

TASCAM PRODUCTION PRODUCTS 709

Will introduce the ATR 60 tape transports, and have on hand its 40 and 50 Series multitrack recorders and lines of mixing consoles, time code audio decks, and battery-powered field recorders.

TEKTRONIX 1330

The new SPG-170A NTSC sync generator will offer RS-170A sync generation, digital genlock and a high stability color standard. Other premiering products will be the WFM-300 component analog video waveform monitor, named "Lightning," which will offer monitor and measure inequalities in component amplitude and timing, and the BTSC modulation monitor and decoder, a single unit designed for stereo applications. From the Portable Instruments Division will be the new 2430 digital, all-purpose portable oscilloscope with 150 MHz equivalent time bandwidth and 100 Ms/f digitizing rate. Other products from the extensive test and measurement instrument line will be shown.

TELEMETRICS 1946

Will show its TM 8505 coax connector for the Ikegami HL-95 or any ENG camera; TM 832 coax, twisted pair, or triax cable; and pan/tilt system for television cameras.

TELEPAK 1739

Will bring its new Mini-Gaff portable gaffer bag and a new Betacam bag,

along with the existing BVW-20 Betacam field recorder bag.

TELESCRIPT 1716

Will show products from its range of scroll and keyboard entry teleprompters, such as the computer prompting program with ROM cartridge, support disk and 10-pushbutton remote controller for the Commodore C-64, which was first seen at NAB. Also new last spring was the Smart Prompter, a prompting program for IBM and compatible PCs with infinitely variable speed scrolling, pushbutton font sizes, underline, and upper and lower case.

TELEVISION EQUIPMENT ASSOCIATES 1012

Will introduce Matthey 350 Series video delays, Racal Freedom I headsets, and the Elcon EA 750 tape evaluator.

TENDEL CORP. 1618

Will bring its video recorder head protrusion and eccentricity gauge for Type-C VTRs, along with other Tentelometer tape tension gauges and the TSH line of spindle height gauges.

TFT 1500

Will have its 850 BTSC aural modulation monitor, 8500 composite subcar-

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ELEPACK NP-1 Battery pack (case not shown)

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rier generator system, 701 monaural frequency modulation monitor, and 7610 remote-control system for small television stations.

THOMSON-CSF BROADCAST 1112

Will introduce new software packages for the Vidifont V graphics system, and will show the Vidifont Viditext II. From the Thomson camera line will be the Model 1623 and 1624 ENG handheld cameras.

TOTAL SPECTRUM 1745

Will show its VS-200M motorized pan/tilt camera remote system; VS-CB-T controller for the VS-200M; HS-100P servo-controlled pan/tilt system and Multicontroller for it; FCS-20 font compose title stand; and the UNI-11-SND uniplexer system for converting 35 mm to video.

ULTIMATE CORP. 1307

Will demonstrate its Ultimate 5 component analog compositor.

UNION CONNECTOR 1104

Will show the line of electric wiring devices and electric distribution equip-

ment, including its universal PC and Commodore computer interfaces, programming, and system components for control of Unilrot dimmers.

UTAH SCIENTIFIC 1602

Will exhibit the AVS 1B routing switcher; MC-500 master control switchers; PLM C1 and SM C1 machine control switchers; and the VDA 8 and ADA 8 audio and video distribution amps.

VIDEO INTERNATIONAL 1724

Plans to introduce three products, the DTC 3500 digital TV standards converter, a comb filter decoder, and the TBC 3000 time base corrector.

VIDEOTEK 1507

New to its lines of professional monitors, receiver/monitors, waveform monitors, vectorscopes, routing switchers, audio program monitors, demodulators and DAs will be the BSG-200 sync generator and the TSM-60 waveform monitor.

VID-VIDEO 1813

Will introduce a zero frame offset ad-

dress track track time code modification, and the Shuttle 1, a vari-speed remote-control for Sony's VP 5000/5600 playback deck. Also new will be the Shuttle 2, for interfacing the VP 5000/5600 to a Convergence ECS 90 or 204.

VITAL INDUSTRIES 109

Will present items from its line of production and master control switchers, the SqueeZoom video effects system, SAM master control automation system, and stereo audio package for master control switchers.

WEST COAST AUDIO 1945

WINSTED CORP. 1209

Will augment its videotape editing console line with the new Model H88-23 console, designed for the Sony half-inch Betacam system. A tape storage system for half-inch tapes will also be introduced.

ZELLAN OPTICS 1409

Will display its Aaton cine cameras; Angenieux and Zeiss lenses; Camrail light tracking system; and Portamount vibration filtering system.



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STATIC FROM YOUR
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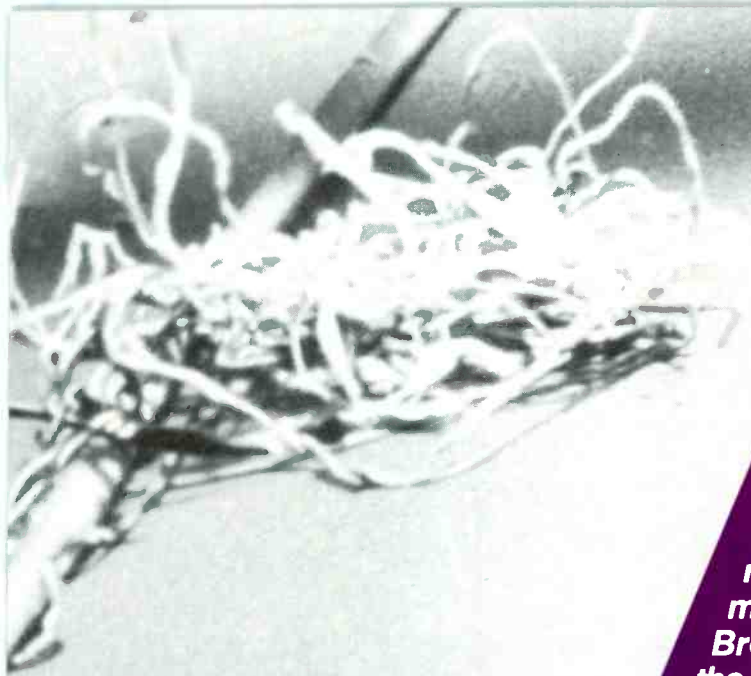
An electron micrograph showing a dark, textured surface, likely the surface of a video cassette tape. The image is filled with numerous small, bright, irregularly shaped particles of debris. A prominent, bright, curved line or groove runs diagonally across the lower half of the frame. The overall appearance is grainy and detailed, highlighting the microscopic nature of the debris.

YOUR WORLD

**STATIC-ATTRACTED DEBRIS ON
VIDEOCASSETTE TAPE... A MAJOR
CAUSE OF DAMAGING DROPOUTS.**

*Electron micrograph final magnification 100x.
Photographed at the University of Minnesota, Electron Microscope Service Laboratory, St. Paul, MN.*

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You're looking at an electron micrograph of videocassette tape. It dramatically shows the debris that a videocassette's inherent static charge can attract. Hair. Dust. Fibers. Cigarette ashes.

Note the size of these particles in relationship to the read head. Is it any wonder they can cause dropouts and picture quality problems?

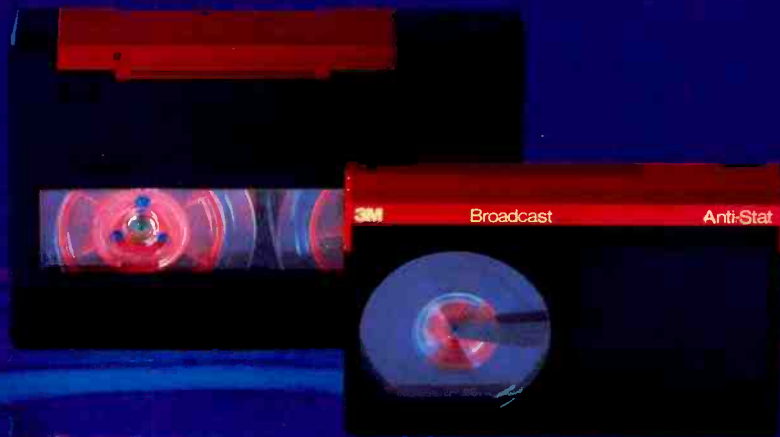
Now our patented new Scotch™ Anti-Stat Treatment solves the problem. It's a revolutionary cassette coating that minimizes static attraction, giving our 1/2-inch Broadcast and 3/4-inch MBR videocassettes the industry's lowest electrostatic charge levels.

The result: Fewer transient dropouts. Less color noise. Better signal-to-noise. A reduction of picture problems caused by static-attracted particles.

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OUR TAPE

ALWAYS AN INNOVATION AHEAD.



Scotch™

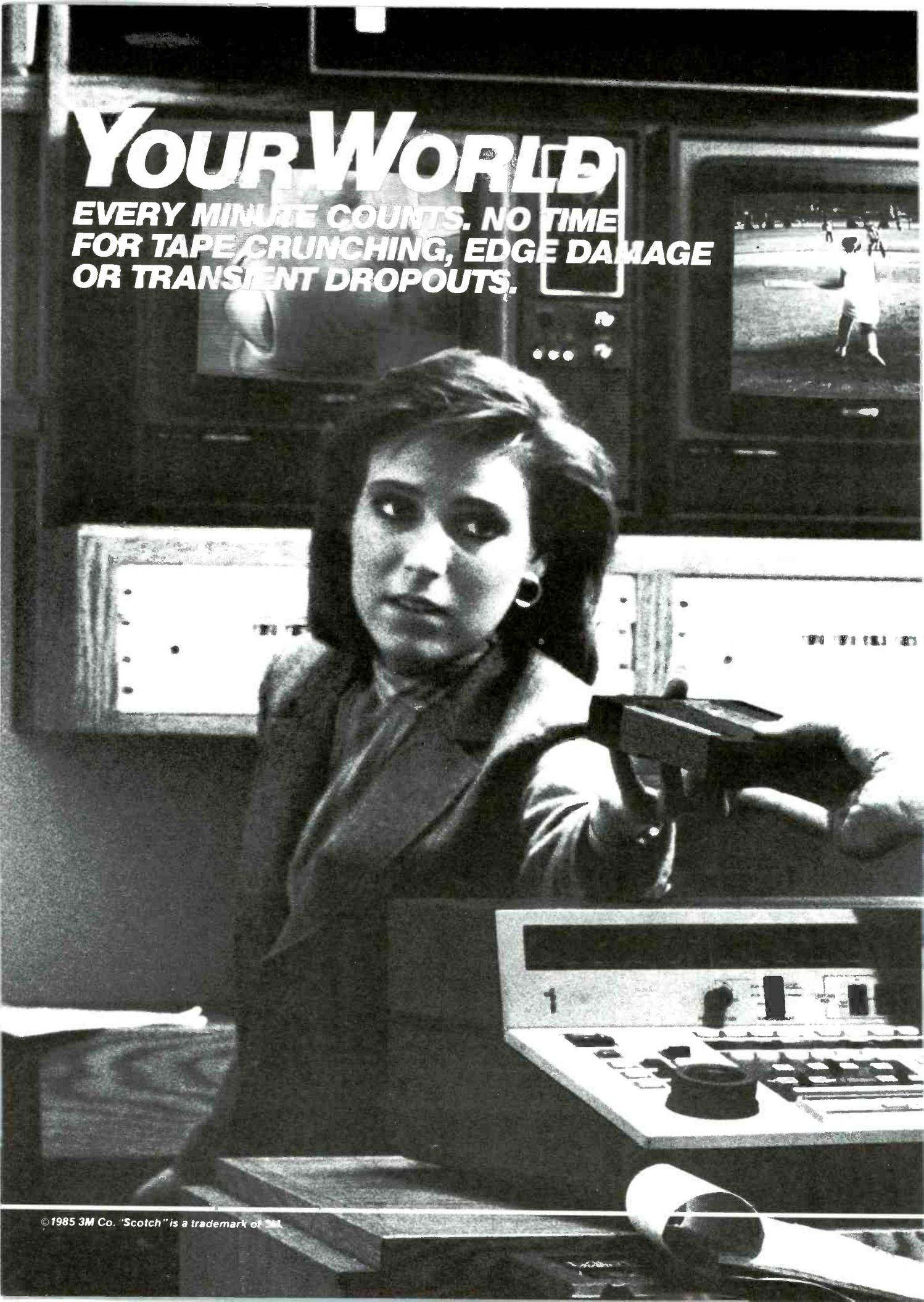
AUDIO & VIDEO TAPES

NUMBER ONE IN THE WORLD OF THE PRO

3M

YOUR WORLD

**EVERY MINUTE COUNTS. NO TIME
FOR TAPE CRUNCHING, EDGE DAMAGE
OR TRANSIENT DROPOUTS.**



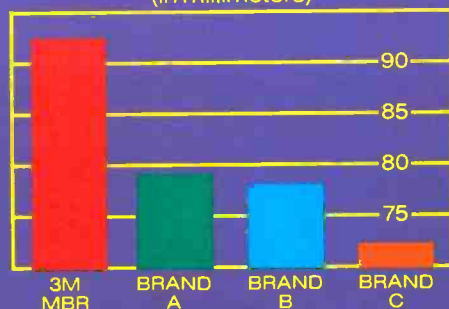
Fifteen minutes to air time, and you have six minutes of videotape to edit into thirty seconds. You don't have any time to worry about whether the machines are aligned perfectly. But you don't have any reason to worry either. Not if you have a tape you can rely on.

We know you need a videocassette that can handle the toughest editing conditions. So we created the Scotch™ 3/4-inch MBR videocassette with a thicker backing to reduce tape "crunching" and edge damage. We also gave it our exclusive Anti-Stat Treatment for fewer transient dropouts.

Less color noise and better signal to noise, too.

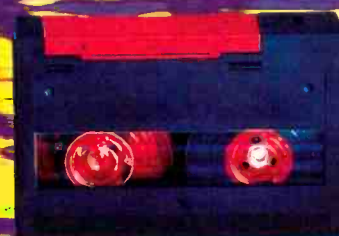
It's available in hanger cases, including Mini U-Matics. With our red doors and hubs for easy Anti-Stat identification. With our engineers just a phone call away. With all the toughness it takes to be number one in the world of the pro.

BASE FILM THICKNESS
(in millimeters)



OUR TAPE

NOTHING ELSE MEASURES UP.



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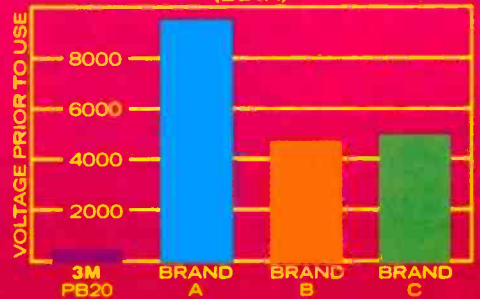
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You've waited three hours in the dust and hot sun to get that spectacular finish, only to have your once-in-a-lifetime shots destroyed by transient dropouts caused by particles drawn into your videocassette by a static charge. But that's always been a risk, until now.

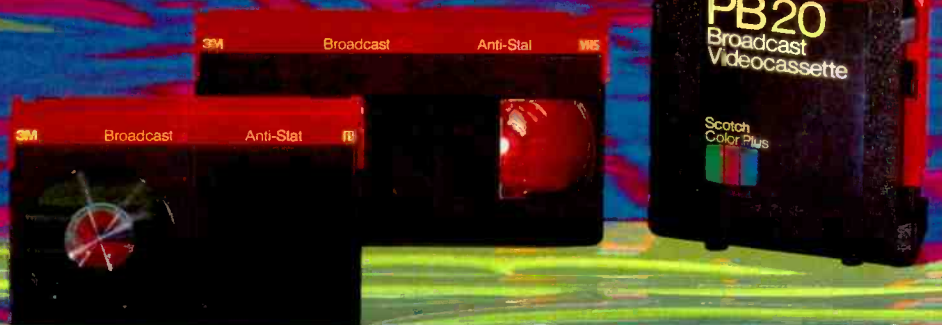
We know you need a 1/2-inch videocassette that can go anywhere without picking up static-drawn souvenirs that will destroy your picture. So we developed the exclusive Scotch™ Anti-Stat Treatment, giving our new 1/2" Broadcast Videocassettes the industry's lowest electrostatic charge levels for unsurpassed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

ELECTROSTATIC CHARGE (BETA)



OUR TAPE

ANTI-STAT...ANTI-DROPOUT.



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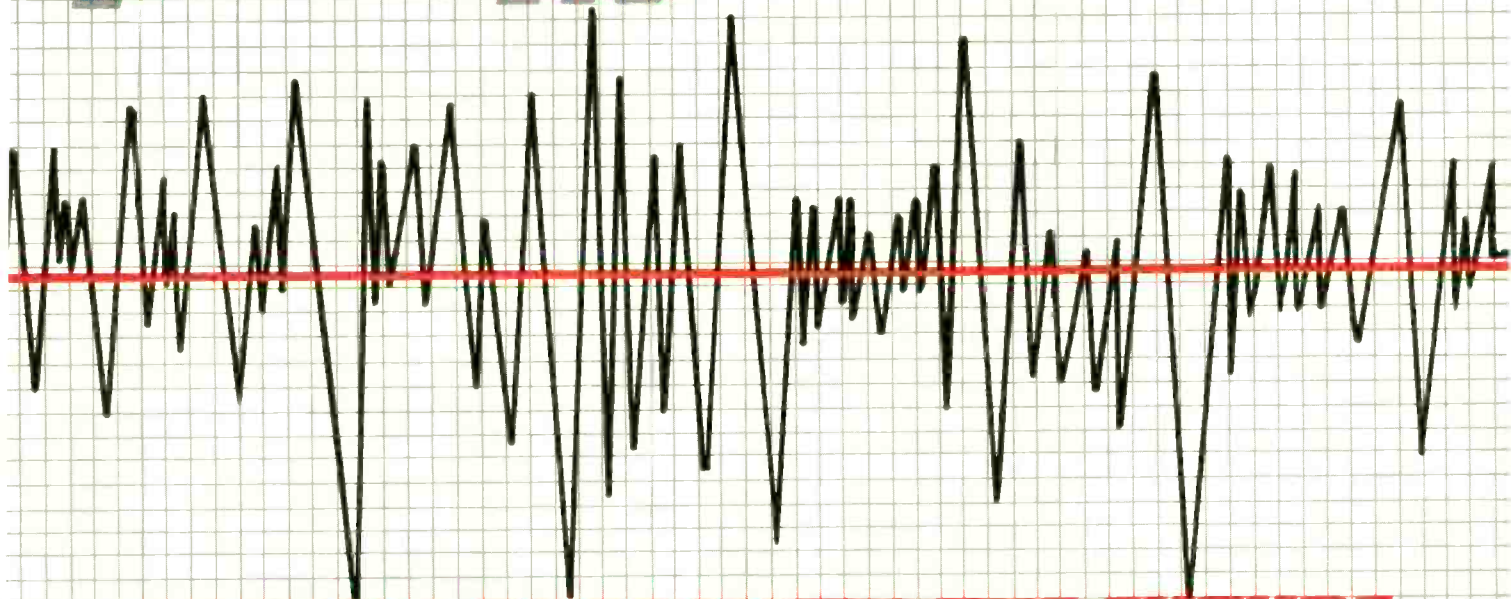
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Precision in MTS: Testing for Stereo

By Robin Lanier

The main problem facing the experienced television engineer setting up and testing his or her transmitter for stereo sound is a psychological one—learning to think about TV audio in terms of precision far above the common expectations of TV mono and of FM stereo. But, if stereo sound is to do even reasonably well the job it was developed to do, critical parts of the system must be adjusted with a precision totally outside earlier TV aural experience.

Appendix D of the BTSC Recommended Practices supplies the nuts and bolts of the testing procedures and standards to be met. A new version was due from the EIA just prior to publication. The standards set forth will of course be

regarded as minimums for acceptable performance.

The new precision must start with signal handling in the studio. Assuming that the studio has been upgraded to get noise and distortion to vanishing levels, a convenient point to start on transmitter testing and adjustment is the aural exciter. It is now widely believed that the exciter must be of the direct FM type for likelihood of good performance with the new expanded audio baseband.

First, the input port must accept the wideband signal. If there is any doubt, there is probably only a simple modification required. Eric Small of Modulation Sciences, which manufactures and markets one of the stereo exciters available today, says that in many cases the required change can be done by terminating the input at 75 ohms, and attenuating it so that 2.5 to 3 volts produces 75 kHz deviation. Other modifications can be made accordingly.

When the exciter is ready, it should be swept over the range from 50 Hz to

TEST & MEASUREMENT

50 kHz, and should be flat within a few tenths of a dB all the way.

Highly important to noise control is a check of the visual exciter and the transmitter for ICPM. The BTSC system is much more sensitive to ICPM than the older mono system. Television engineers have been monitoring ICPM for years. What is new is the need to get ICPM below three degrees for reasonable stereo performance and below one degree for the best stereo. A high level of ICPM may result from misadjustment of the transmitter. The maker should be consulted, because in some cases there are retrofit adapters to reduce the ICPM level in specific transmitters. Measuring ICPM takes a high-precision phase meter.

The tests for encoder tracking and for separation, will in many cases be better done after the engineer has lined up the system in the "Equivalent Mode" (as described later). The two tests must be made in the "BTSC Mode," with the encode-decode system in place.

Vital tracking

What may well be the most difficult and critical adjustment of all is that for tracking of the noise reduction encoder and decoder.

The companding in the L-R channel complicates the system far beyond that for FM stereo, which is linear in both the L+R and the L-R. The performance of the whole BTSC system can be seriously degraded if the companding encoder and decoder do not track together. An error of a small part of a dB can cause trouble.

The reference of both the transmitter end and the receiver end is the deviation of the carrier. To make sure the proper carrier deviation is the reference at the encoder, a procedure has been developed that has extremely high accuracy.

Each stereo generator includes a calibration mode that connects to the reference level of the encoder. With this mode set and adjusted as set forth in the instructions for the generator, the engineer injects an audio signal of 10,396 Hz at the generator input. Then he or she adjusts the modulation level at the transmitter so that the carrier just disappears. This is the Bessel null, with all the energy in the sidebands; it occurs at exactly 25 kHz of deviation.

The encoder reference is thus established at 25 kHz. The decoder reference, established by the maker of the receiver, will normally be at the same level. The 25 kHz level represents 100 percent modulation of the L+R channel.

Separation for quality

Highly significant for overall performance is the channel separation across the frequency band. A variety of faults can degrade the separation, so excellent separation is a good mark of proper performance. A benchmark figure for top performance is 40 dB. The BTSC minimum is 26 dB, 100 Hz to 8 kHz.

In getting set to measure the separation, however, the engineer runs into difficult accuracy problems if he or she tries to use established test gear. The quantities that have to be measured are likely to be smaller than the accuracy of the test gear. The industry is coming up with some new approaches to this problem. At least two modulation monitors, aimed specifically at BTSC and claiming extremely high accuracy, have recently been introduced to the market. Belar Electronics has the TVM-100 and TVM-200, which work together to measure 20 or more of the quantities in a BTSC operating system. TFT's Model 850 Aural Modulation Monitor, also designed specifically for the BTSC job, offers a very large complement of tests.

B & B Systems, which already markets the AM-1, AM-2 and AM-3 stereo phase and SMPTE time code verification systems, has recently introduced a new product called the Imagescope, which graphically displays a stereo audio signal: balance, separation and level of the stereo signal (see box).

Another way to get the separation figures is through a computer simulation of a perfect stereo modulator-demodulator system, into which are fed amplitude and phase measurements of an actual system. Then the computer will deliver the separation figures. Such a method was outlined by J.J. Gibson of RCA in a paper that is now in Appendix D of the BTSC recommended practices. The paper describes the program and shows how it is to be used. It depends on highly accurate gain and phase measurements.



Belar's TV stereo modulation monitor is one of the products that has been introduced to meet the growing demand for MTS test equipment.



The new aural monitor designed by TFT specifically for BTSC stereo provides a variety of MTS test functions.

Modulation Sciences, developer of the TSG stereo generator, has developed a similar computer program with the same purpose. Small says it runs on a variety of personal computers and is available to any engineer who needs it.

This leaves the problem of making very accurate measurements of the amplitude and phase performance of the system under test. The new modulation monitors may be useful here. An alternative is to use a wideband aural demodulator with the addition of a low-distortion audio oscillator (less than 0.1 percent THD), a frequency counter to measure the exact frequency being injected, a digital ac voltmeter flat to at least 100 kHz, and a high-precision phase meter (accurate to ± 0.03 degrees). The wideband aural demodulator has been a problem, but this is beginning to open up with the promise of the new modulation monitors, and of new equipment designed specifically for back-to-back checkout, such as Modulation Sciences' new Model

TEK'S NEW 1710B: THE BRIGHTEST IDEA IN WAVEFORM MONITORING.

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TEST & MEASUREMENT

SRD-1 television stereo decoder.

There are several other wideband demodulators which manufacturers are beginning to aim at the rapidly growing MTS market. Tektronix has an enhanced demodulator with a bandwidth widened to 150 kHz. Telemet and Rohde & Schwarz also have wideband demodulators and Elecon has a demodulator that features cards for either MTS or SAP.

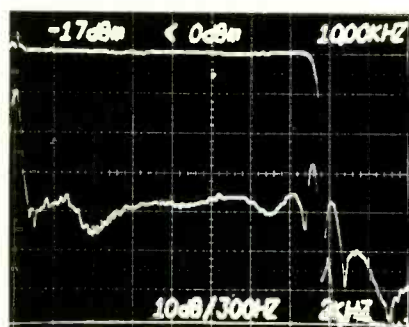
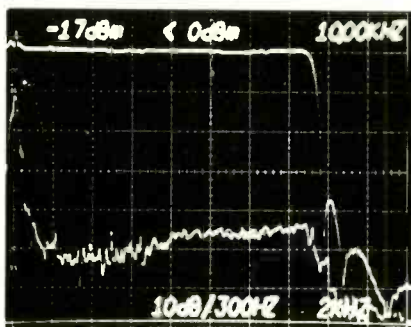
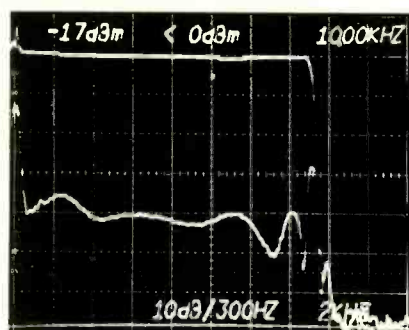
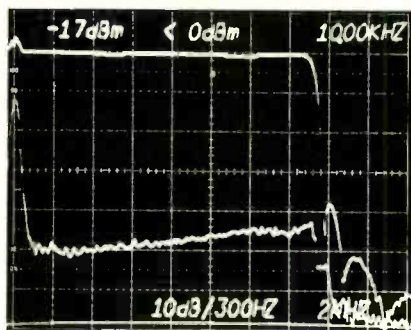
If separation falls below the standard substantially, the engineer may check for a number of faults, among them an error in the encoder reference level (an extremely sensitive standard, as already noted), phase shift or uneven amplitude response in the exciter, improper design of the companding units, excessive noise or distortion, or a stereo generator out of alignment.

One problem that remains is that of old standard performance errors. They are basic, in any communications system, but measuring them involves another large complication of BTSC checkout. The nonlinearity of the encode-decode system makes a number of these "straightaway" tests extremely difficult. Therefore, the BTSC has devised a test method called the "Equivalent Mode," in which the whole encode-decode system is replaced by standard 75-microsecond preemphasis and deemphasis. The system thus becomes linear, like an FM stereo system, and a number of essential checks can easily be made.

All crosstalk and noise measurements and those for harmonic distortion are made in the Equivalent Mode. It also allows for checking the effects of the diplexer on separation. This method allows the system to be brought near perfection before the engineer undertakes the very difficult actual operation tests already described.

To check distortion, the engineer needs a low-distortion oscillator, a baseband spectrum analyzer and an aural demodulator. Measuring the THD is not helpful because the engineer needs to identify the main harmonic components, which will be mainly the second and third harmonics. The low-frequency spectrum analyzer gives the picture he or she needs.

The check should be made at frequencies from 5 kHz to 100 kHz, in 5 kHz steps, and at ± 25 kHz, ± 50 kHz,



Scope patterns show results of separation test in the two test modes: left, the equivalent mode (companding removed), and right, with the companding in the circuit. Top pair were made with Modulation Sciences stereo generator back-to-back with Modulation Sciences SRD decoder. In bottom pair, the Larcas TEC-IV transmitter was included in the test loop.

± 75 kHz, and ± 100 kHz deviation. In most cases, third harmonic will pre-

dominate and should be below 0.5 percent (48 dB down), and better if lower.

An Update on the X-Y Scope Display

A considerable refinement of the frequently used x-y scope display of serial program material, familiar to recording engineers since the advent of stereo, is embodied in the Imagescope, a new device put on the market by B & B Systems of Valencia, CA.

Imagescope abstracts the amplitude and phase relations between the two channels and displays them in a form that makes the channel dispersion patterns instantly evident, even to the untrained viewer. Loss of a channel, or heavy unbalance on one side, can thus be seen immediately. And out of phase situations, which can be seriously destructive to mono quality, or virtually eliminate the mono signal, show up quickly so



The Imagescope, from B & B Systems, graphically displays balance, separation and level of a stereo signal.

that corrective action can be taken to avoid creating a program unacceptable to mono viewers.

The device is also useful in recording mixdown operations, allowing each track to be panned separately to the exact stereo position and amplitude wanted, in advance of actual sound monitoring.

The old x-y "scrambled egg" pattern demanded an expert for interpretation. Imagescope, the makers say, gives the same information and much more, and in an easily readable form.

FACT!

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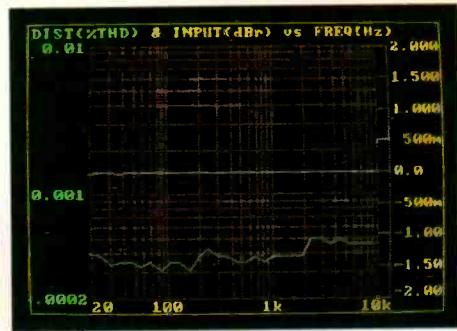
Provides real time test results graphed on screen; paper print-out at the touch of a key.

Comes bundled with software package for all common audio tests; runs automated tests 20 minutes out of the box.

Allows expansion with future modules for additional audio tests.

Total system cost, including computer and standard three year warranty on System One, is 1/2 the price of other automated audio test systems.

System THD + N	0.001%
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Distortion of more than about 0.5 percent at 50 kHz deviation is likely to impair the stereo performance.

Some possible causes of third harmonic distortion are nonlinear operation or slew-rate limiting in the stages ahead of the modulator; nonlinearity of the varactor diodes; and narrow bandwidth in the exciter, transmitter, or diplexer. The diplexer, which some in the industry saw as a major stumbling block for TV stereo, has turned out in most cases to cause no serious trouble. It can be checked by injecting a

wideband signal and measuring bandwidth at the input and output.

Noise and distortion are especially serious as frequent causes of crosstalk—interference from channel to channel or to the pilot frequency—as well as degradation of separation. Bob Orban of Orban Associates, developers of the Optimod-TV 8182A stereo generator, lists protection of the pilot as among the most important objectives of the testing process, along with separation, encoder-decoder tracking, and the other major needs. Pilot protection is

extremely critical because of the very exacting requirements of the filters, which must allow full main channel response to 15 kHz but cut it 50 or 60 dB at 15,374 Hz—the pilot frequency.

A lot of the expertise and the equipment for MTS test and measurement are very new in the industry, but it is clear that the main problems are being solved, or soon will be. **BM/E**

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

TV Transmitter Testing: An Ounce of Prevention

In the "old days," working on a TV transmitter was a constant headache. There were frequent breakdowns. The air signal had to be constantly checked, and the transmitter tweaked. Tube life was short, and tubes required frequent changing.

Today, of course, there is an increasing tendency to treat a transmitter as just one more piece of high-tech gear in the broadcast plant. The transmitter crew has the occasional breakdown, usually handled by automatic switching to the backup transmitter. New solid-state designs offer digital diagnostic tools that indicate exactly where the fault lies. And when the tube rarely fails, the engineer simply inserts another one.

This situation is particularly true for the new mid- to high-power UHF stations that are coming onto the air in droves. Interested in maximizing profitability, and therefore reducing the number of operations and engineering personnel, the new TV stations buy as much automatic equipment as they can, and often rely on contract engineers to supplement a small on-staff engineering department.

This, of course, is not a problem in everyday operations. The new generation of transmitters truly does run itself. Even when there are problems, they can often be handled by a smart-thinking engineer with access to a telephone to his vendors.

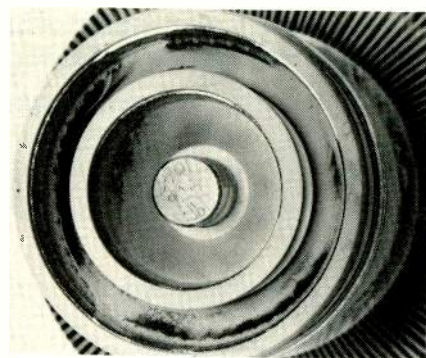
But there is, indeed, a new problem starting to creep into the UHF TV market: there is simply almost no testing

going on whatsoever, short of insuring that the station is, indeed, on the air and putting out video and audio (usually remotely sensed by an alarm system connected with the standby switching network). And, of course, the blame for this rests squarely with short-sighted management, which in its zeal to save engineering salaries may indeed be costing itself even more money.

Short-sighted management

Providing testing and maintenance is a simple matter of dollars and cents. Today, an "average" transmitter tube lasts 8000-10,000 hours (although there are some tubes which have lasted as long as 50,000 hours). Given an average tube cost of \$6000-\$10,000 for medium-power UHF models, this yields an average cost of \$8000 for an average life of 9000 hours, or a tube operating cost of \$1.11 per hour. If a station is on the air for 15 hours a day, the tube alone costs \$16.65 a day.

But what if the tube is not properly maintained, and the transmitter not properly aligned? In this case, tube life can be as short as 6000 hours—not an exaggeration, but based on actual cases reported by transmitter manufacturers. With a 6000-hour average life, the cost per hour for the tube rises to \$1.66. And the same 15-hour broadcast day now costs \$24.90—\$9088.50 a year. The over-\$3000-a-year difference is directly attributable to the simplest of maintenance and alignment procedures.



Improper tube maintenance and transmitter alignment can reduce tube life by as much as a third, as seen with this overheated base.

Besides facing additional costs for the tube itself, the station that does not perform adequate transmitter testing also faces the additional cost for tube replacement necessitated by having a factory technician come and install the new tube.

Testing requirements

In fact, the procedures for testing and aligning the transmitter are quite simple, requiring only a knowledgeable engineer and readily-available equipment. Transmitter testing falls into three phases: RF testing, power measurement, and video monitoring. The chart accompanying this story outlines three "packages" (basic, mid-range, and deluxe) that can be used to estimate the costs of purchasing test equipment.

What, specifically, is required in the way of testing?

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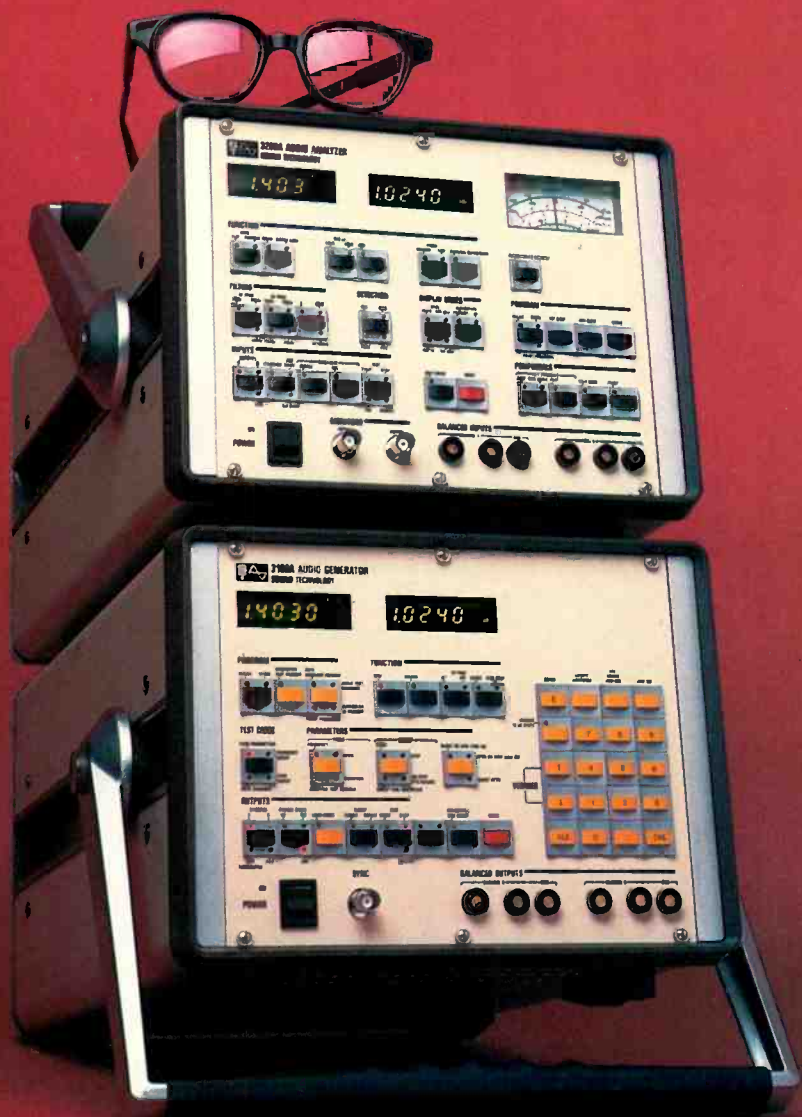
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2. Dummy load ¹	\$1000	\$1000	\$1000
3. RF sweep generator	\$1495-\$1800	\$2800-\$3495	\$3495-\$3845
4. X/Y Oscilloscope	\$395-\$1000	\$595-\$1000	\$1800-\$2500
5. Cables, connectors, etc.	\$150	\$150	\$150
6. Spectrum analyzer	Unnecessary	Unnecessary	\$10,960
7. Sideband adapter	Unnecessary	Unnecessary	\$5780
TOTAL	\$3890-\$4750	\$4895-\$6445	\$23,535-\$25,035
Power Measurement			
1. Dummy load	\$1000	\$1000	\$1000
2. Watt meter	\$475-\$650	\$475-\$650	\$475-\$650
3. Video test signal generator ²	\$695-\$995	\$995-\$2500	\$2500-\$10,000
TOTAL	\$2170-\$2645	\$2470-\$4150	\$3975-\$11,650
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1. TV demodulator	\$1680-\$2300	\$2300-\$9500	\$2300-\$24,000
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3. Vectorscope	\$1860-\$2050	\$2050-\$2850	\$2850-\$8500
4. TV monitor	\$630-\$984	\$984-\$2000	\$2000-\$5760
5. Video test signal generator ²	\$695-\$995	\$995-\$2500	\$2500-\$10,000
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TOTAL PACKAGE:	\$9830-\$12,729	\$12,699-\$28,145	\$37,860-\$79,245

NOTES: 1. This item redundant and specified in two test sets. Also price varies according to specific power level. This load rated at 1 kW.
2. Redundant items specified in two test sets.

Power calibration

Power calibration of the transmitter should be performed on a regular basis to ensure proper operation both under FCC rules as well as transmitter specifications. Monitoring of the output power can be done at the coupling section provided with the equipment, or via a directional wattmeter. It is recommended that a wattmeter line section be installed at the time of equipment installation to be used as a backup power indicator as well as a reference for power

calibration. Also a spectrum analyzer will be needed to establish the correct aural-to-visual carrier ratio, and aural meter calibration.

The transmitter should be connected to a substantially resistive load/termination, rated to handle on an average basis the full peak power rating of the transmitter. Once the power level has been established, the transmitter is reattached to the transmission line and the antenna is checked again. In both cases, the filters supplied with the transmitter must be included in the out-

put circuit of the amplifier before the measurement point.

If the factory-supplied coupler section is to be used for power calibration, a microwave power meter is often necessary. The coupled parts of the section are factory-calibrated against known standards and have been adjusted for specific coupling values dependent on transmitter output power. Listed below are coupling values per unit power:

1 kW-38 dB
2 kW-41 dB
2.5 kW-42 dB
5 kW-45 dB
10 kW-48 dB

These values will provide a 95 mW average power output as measured at the forward coupled port, under the specific conditions of:

1. Visual carrier only, (aural carrier off).
2. Sync and blanking level video only, (black picture), sync pulse amplitude 40 IRE units (.286 volts).

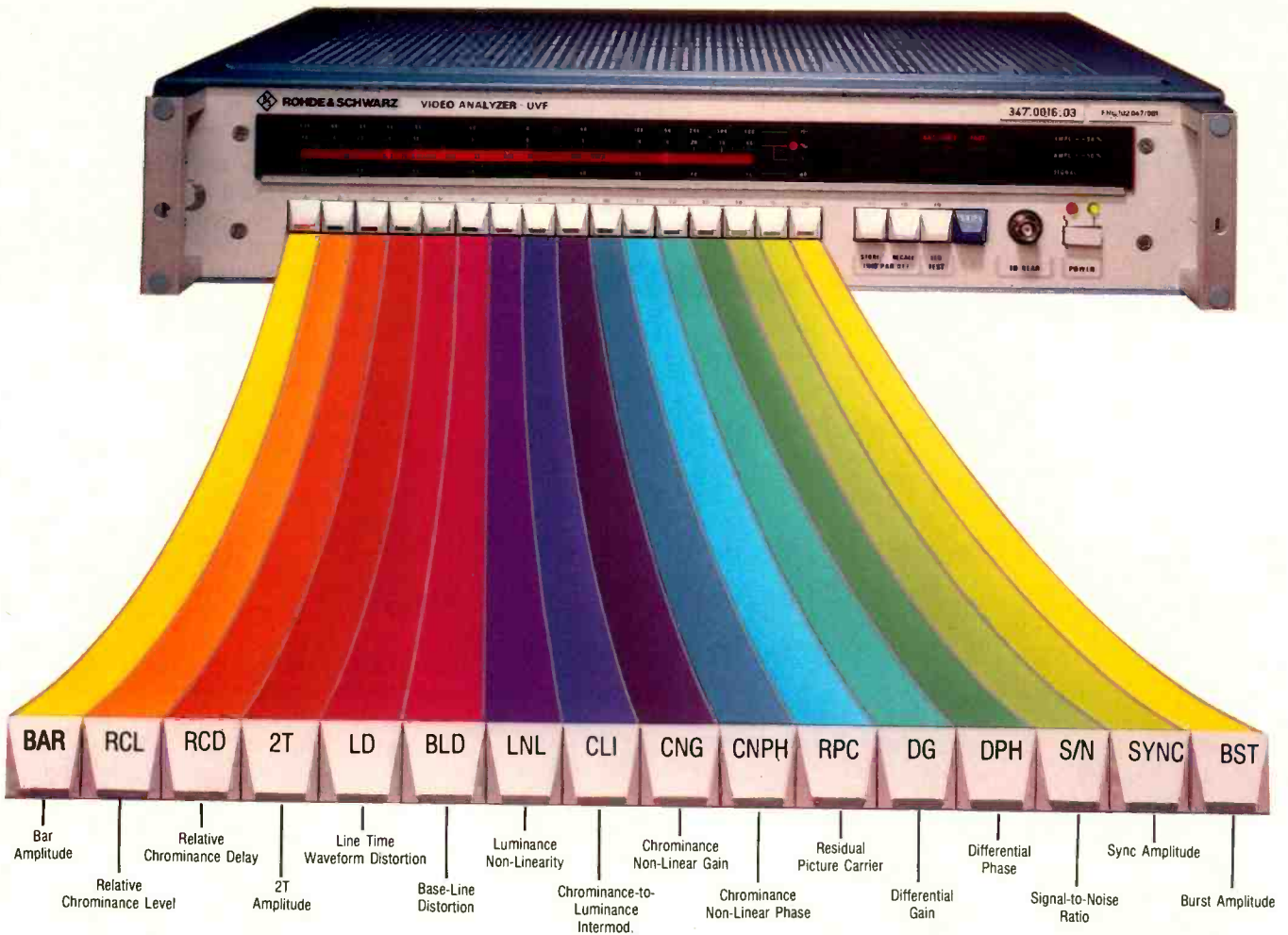
Using a directional wattmeter, any plug-in element selected should provide maximum deflection of the meter to minimize meter movement errors. The transmitter rated peak visual power rating is divided by the conversion factor of 1.68 to obtain the average power reading that will be displayed on the meter.

Once the visual power is established, the aural carrier can be turned on and the output signal of the transmitter displayed on the spectrum analyzer. The spectrum analyzer is used to establish a 10 dB aural/visual ratio. Aural carrier level must be set using the modulator aural carrier level control. The main power set control should not be adjusted.

When both levels have been set, the transmitter monitor box can be opened and meter drive levels adjusted to indicated properly.

The reflected or reverse power meter can now be calibrated and the VSWR fault circuits checked.

Turn the transmitter on and allow to cycle up. With transmitter adjusted for rated power output, reverse the diode detectors at the output power coupler. The forward coupler port is now attached to the reverse input port of the box and forward power is read on the



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reverse power meter of the control meter panel.

Adjust the reverse power monitor board in the monitor box for proper indication of output power, on the reverse meter scale.

Plate current fault

This procedure should be done with the mains power applied and the transmitter in a LOCAL-OFF control mode. An external dc power supply is required that has the capability of delivering the specified current; also, an external ammeter of sufficient capabilities is needed.

Connect a dc supply through the ammeter across the plate return resistor positive of supply to ground, negative to opposite quote side of plate return resistor. Alternately, if the resistor is not directly accessible, identify and place negative supply lead to point E101 of plate supply bleeder stack.

Turn external supply on and adjust voltage/current to yield specified current level through return resistor.

Screen current fault

This procedure should be done with the mains power applied and the transmitter in a LOCAL-OFF control mode. An external dc power supply is required that has the capability of delivering the specified fault level current. Also, an external ammeter of sufficient capability is needed. Different equipment setups are necessary due to two different sense resistor locations. Type one uses the low side return resistor as the sensory resistor, and type two uses the high side in line resistor.

Setup for low side return resistor sense: Connect a supply through the ammeter across the screen return resistor. Positive of supply to ground, nega-

tive of supply to opposite side of resistor, point E201.

Setup for high side in-line resistor sense: Connect a dc supply through the ammeter across the screen current limit resistor. Positive of supply to point E203, negative of supply to point E204.

Turn external supply on and adjust voltage/current to yield specified current level through resistor.

VSWR fault

This procedure must be done in LOCAL-ON control mode, with RF power applied. Fault level is 10 percent of rated peak power output. The reverse power meter must be calibrated before this procedure is performed.

With RF power control set to minimum, reverse the reflected and forward video detector diodes at the output power sensing coupler. Observe reverse power meter scale on transmitter while gradually increasing power output. At 10 percent of rated power as indicated on this meter, the fault display LED indicator should register. (It may be helpful to place 10 dB of attenuation with set value pads, in-line, between the low-level amplifiers to reduce the sensitivity of the power control.)

Maintenance schedule

In order to obtain maximum system reliability and maintain optimum performance from the equipment, it is important to establish a systematic preventative maintenance schedule. A well constructed program will aid the operator in identifying potential problems. **BM/E**

The editor wishes to thank William Barrow III, Test/Service manager at Acrodyne Industries, for his help with this story.

TV Monitors: Designing a New CRT

By Larry Thorpe

Back in the late 1960s, when the Sony Trinitron television receiver took the consumer market by storm, the broadcast and teleproduction markets still awaited advances in medium- to high-

resolution color CRTs to better satisfy their vastly different requirements. Two issues of concern were the enhanced color saturation of the Trinitron and the inherent concealment of high-frequency noise. Although these properties were perfectly suited to consumer

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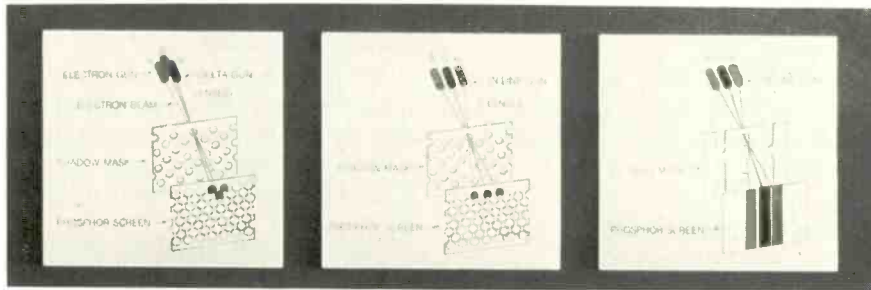
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TEST & MEASUREMENT

receivers, a more rigorous design approach was needed to provide professional users with an objective evaluation of the complex picture requirements for broadcast and teleproduction studios.

The need for better monitor design was dictated in part by other changes in the market. During the 1960s and early 1970s, color cameras were not noted for their stability. Considerable effort was expended daily to realign these complex systems. As camera stability rapidly improved from the mid-1970s on, however, the instability of color monitors was increasingly exposed as the weak link in the equipment configuration.

Variations in CRT design affect the performance and quality of each different kind of monitor system. There are, in fact, three cathode ray tube designs in the shadow mask technology. The delta gun dot shadow mask CRT employs a triangular configuration of elec-



Left to right, the three standard color CRT configurations: delta gun dot shadow mask, in-line gun dot shadow mask, and in-line gun slot shadow mask.

tron guns and beams. Since the beams pass through round holes in the shadow mask and are directed to land on a single phosphor dot, extensive convergence adjustments are required for precise alignment of the beams.

The in-line gun dot shadow mask CRT is similar except that the electron lenses are arranged in a linear fashion. The resolution of this system is inherently less than that of the delta gun CRT.

The third design, the in-line slot shadow mask, resembles the in-line CRT with the difference that the metal mask uses vertical slots instead of round holes. This system has no dynamic convergence controls.

An entirely different system, the aperture grille, was featured in the Trinitron tube. Researchers realized that the aperture grille structure was inherently better suited for high resolution than the delta and in-line designs of

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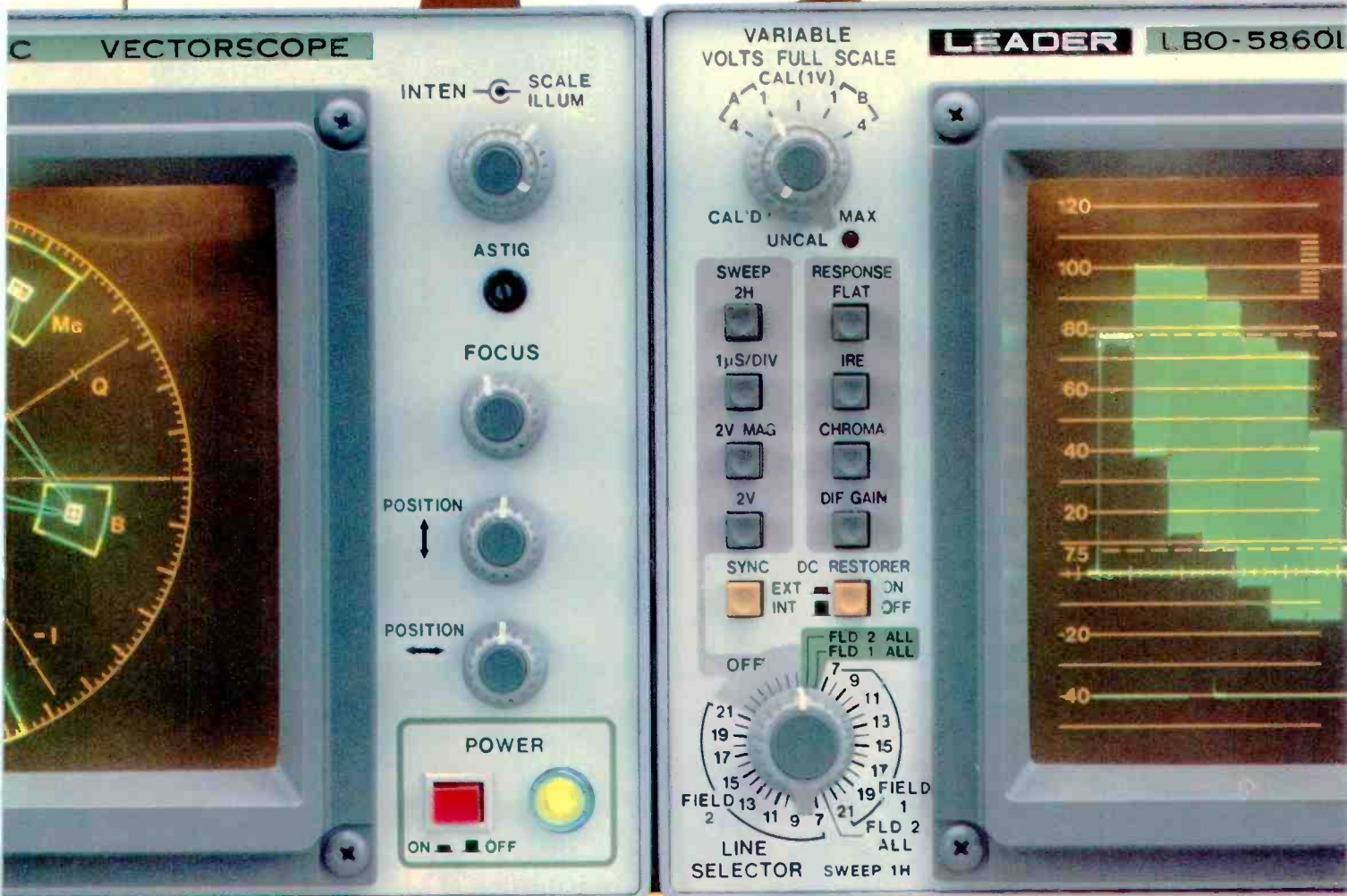
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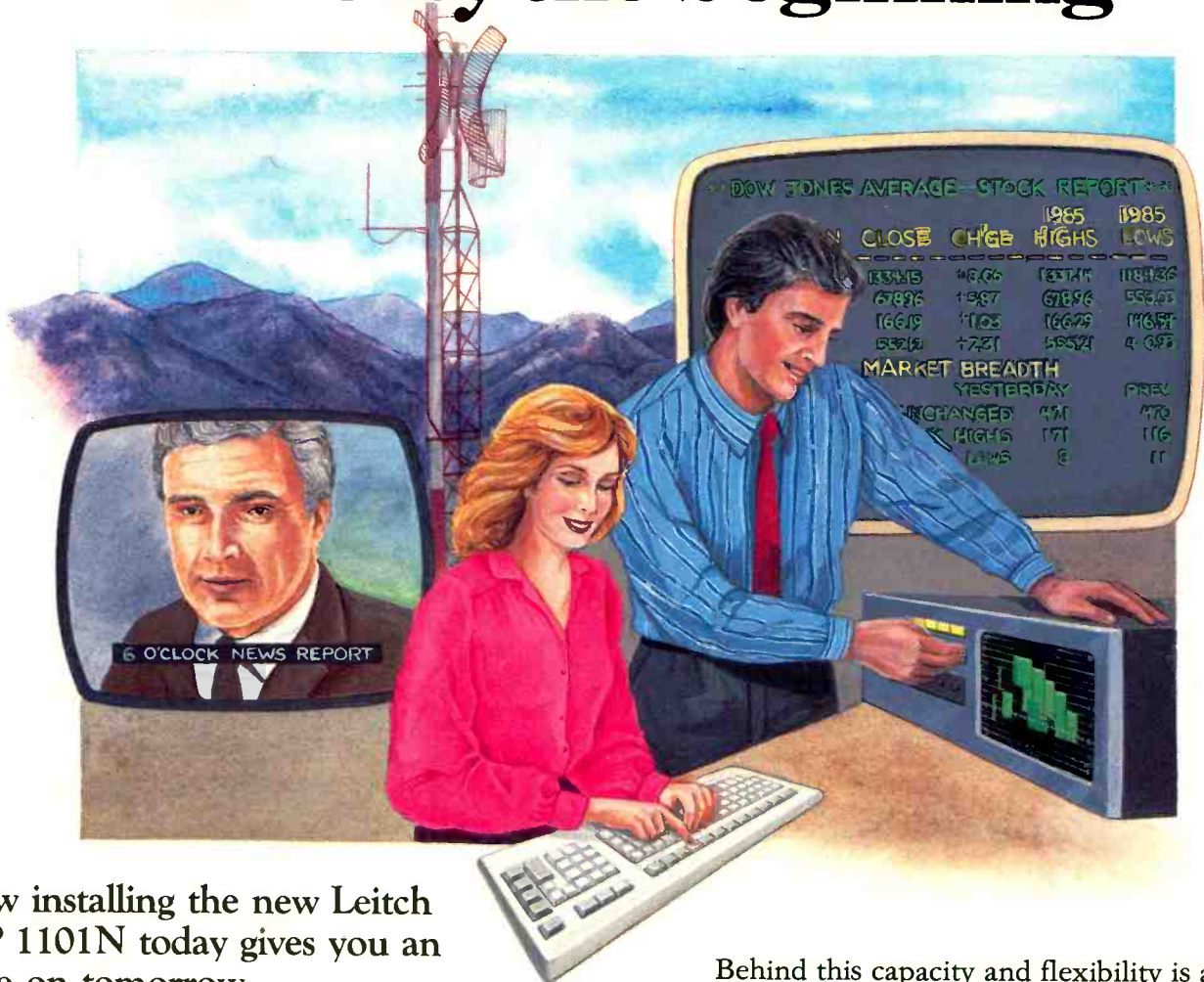
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the shadow mask CRTs. The curvature of a shadow mask places a physical limitation on the number of holes that can evenly and precisely be accommodated so as not to weaken the structure. Therefore, a much lower percentage of the beams can penetrate the shadow mask holes. Furthermore, the bombardment of the beam on the metal screen can distort the uniformity of the screen, which, in turn, alters the color reproduction of the image. The aperture grille design, on the other hand, is composed of relatively wide stripes through which the electron guns can efficiently shoot beams to land on the phosphor stripes.

The number of holes that can be designed into the shadow mask is also limited by the distance between them. If there are too many, the R,G, and B color signals can overlap the blackened area (or black matrix) around the phosphors, producing blotchiness or cloudi-

ness in the image display. For this reason, it was determined that the distance between the holes of 19-inch monitors must be limited to 0.43 mm (0.31 mm for 12- and 14-inch monitors) in order to maintain acceptable uniformity.

All these considerations led Sony to retain the inherently superior aperture grille design in its first major refinement, which in the late 1970s vastly improved the CRT's high-resolution capability. (The electro-optical system, as described below, was also redesigned for higher resolution.) The Sony single-gun, three-beam aperture grille reduces the variables of alignment. It directs the beams to land precisely on the phosphor stripes, without excess beams warping the grille. Its straight, taut, striped design allows the beams shot from the single lens to penetrate the grille more fully, thereby requiring only horizontal alignment.

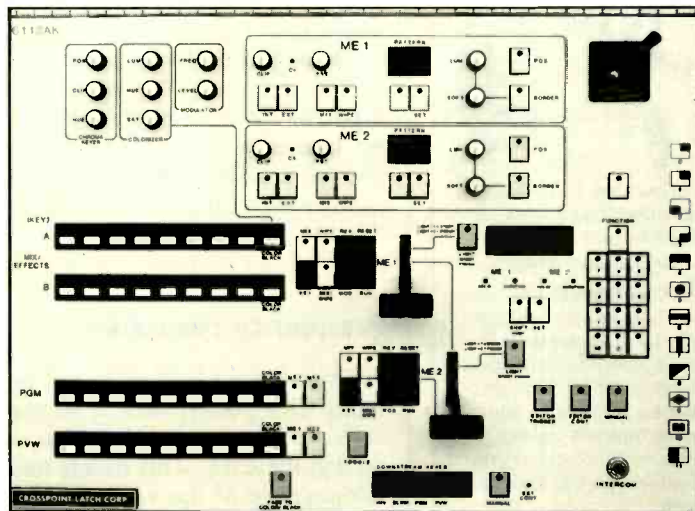
Improved electro-optical design

Since color CRTs for broadcast monitors are complex electro-optical systems, the design of their components and their resulting performance involve advanced technology and precise engineering. Sony provided the high-resolution requirements for a broadcast monitor series by addressing all the inherent properties that determine the ultimate quality of color CRTs. Of foremost concern to broadcasters is the resolution capability of color CRTs. A high-resolution CRT, on the average, displays 550 TV lines in the center of the raster, critical for scrutinizing a wideband video signal.

Three factors affect a monitor's resolution capability. First, the pitch (or distance) between two adjacent phosphor centers or stripes determines the ability to resolve fine detail. Since the

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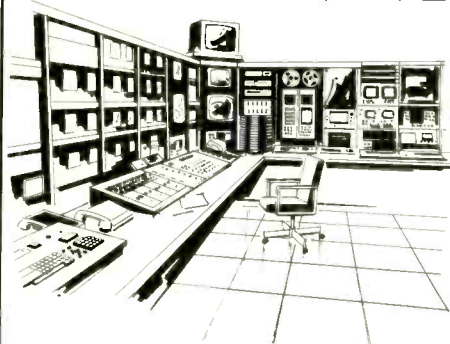
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*Allen & Segal/IBM, 1974

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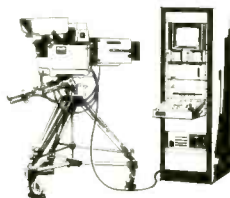
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Sony monitor design involves an aperture grille of stripes rather than a series of holes through a shadow mask, grille slots are precisely correlated to the phosphor stripes.

Second, the beam itself must be small enough to pass unobstructed through the holes of a shadow mask or the slots of an aperture grille. A precise, narrow beam produces the highest resolution. Once the beam is fired, it must be focused through a lens system. The three small lens systems of the shadow mask design force portions of the beam through the outer part of the lenses, causing them to miss the holes and instead bombard the shadow mask itself. This causes heating, which in turn causes warping and consequent distortion of the action of the shadow mask.

The single lens of the Sony system has a larger diameter than the other lenses (two inches versus one inch for the delta shadow mask and 0.7 inch for the in-line shadow mask). Since the center portion of the lens is larger, focusing the beams more accurately, it does not force any part of the beam to pass through the outer lens, so uniformity of color is maintained.

The in-line configuration of the Sony single lens also provides easy alignment and precise focusing through the phosphor screen. The delta shadow mask, on the other hand, requires that the beams be aligned both vertically and horizontally due to its triangular configuration. Beam spot size is also limited due to the curvature of the mask.

Frequency response

Third, frequency response maximizes CRT performance if no restrictions are introduced to the video signal driving the CRT. This means that the transparency of the video circuit frequency response must be consistent throughout and beyond the broadcast band (to 5 MHz). The Sony BVM-1900 monitor series specifies a frequency response out to 10 MHz \pm 1 dB, guaranteeing the delivery of a CRT video input that optimizes the picture tube capabilities.

This very high-resolution capability totally removes any noise-reducing mechanism from the CRT. The con-

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1. Indicate your status on the following types of T&M equipment. Please use the boxes to indicate how many of each type of equipment you have now or intend to buy:

	intend to buy			
	have now/ on order	within 3 mos.	within 6 mos.	within 12 mos.
Automatic video test system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Automatic audio test set	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Spectrum analyzer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
High-res color picture monitors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Portable oscilloscopes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RF sweep generators	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TV demodulators	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TV Test signal generators	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Waveform monitors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vectorscopes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Waveform/vectorscope combos	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Portable video monitors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wattmeters, calorimeters	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Systems analyzers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Color bar generators	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. In general, what do you consider the most pressing issues in test & measurement today?

3. If you could buy only one piece of new equipment for T&M next year, what would it be?

4. About the stories on T&M (TV Monitor Design, Testing for MTS, and Transmitter Testing) in this issue:

- Did you find them informative? yes no
 Did they contain enough detail? yes no
 Did you read all of them? yes no
 Will they influence your buying plans? yes no
 Did you pass the issue on to others? yes no If yes, how many? _____

COMMENTS: _____

5. About yourself: Do you work at a:

- TV station Radio station Production Company
 TV network Radio network Post-Production Facility Other (specify) _____

Are you a:

- Chief engineer Engineer General Manager
 Production manager Operations manager Other (specify) _____

Do you:

- use the equipment? make buying suggestions? evaluate equipment?
 make buying decisions?

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TEST & MEASUREMENT

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*As required by BTSC Standards, EIA Systems Bulletin No. 5, Section 3.2, Monitoring and Measuring.



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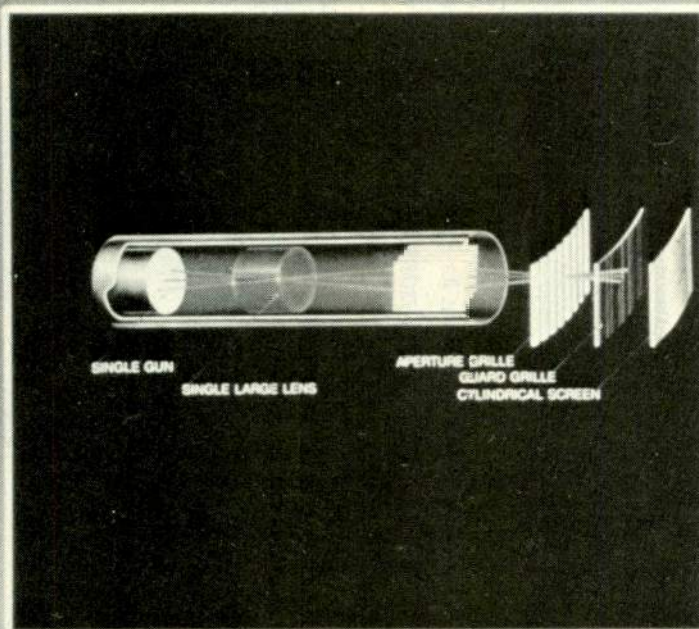
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TEST & MEASUREMENT

Color Picture Tube



The aperture grille design uses a single electron gun and a single large lens directed at the grille slots.

sumer Trinitron inherently reduces noise visibility because of the horizontal filtering effect of the coarser Trinitron grille. The Super Fine Pitch grille of the Sony broadcast monitor, however, accurately portrays the real noise content of the video signal.

Historically, color CRTs have been deficient in providing a uniform white raster at reasonable levels of brightness. Purity is a measure of the uniformity of the white raster and is a function of the color beams reaching the raster. For this to occur, the three beams must be optimally focused and precisely targeted, otherwise stray beams may affect the purity. The curved nature of the shadow mask, with holes around which some of the beam is deflected, makes it vulnerable to deformation.

On the other hand, the straight and taut structure of the aperture grille, with slits through which the entire beam passes, eliminates thermal or warping effects and optimizes the efficiency of beam alignment. Hence, a pitch of 0.30 mm (900 TV lines) can be employed

with an aperture grille CRT, whereas a shadow mask CRT with a pitch of 0.31 mm will exhibit severe uniformity problems due to deformation of the mask. Shadow masks must employ a larger pitch of 0.43 mm to optimally reproduce 630 TV lines (in the center) with uniformity comparable to the 900 TV line capability of the Sony aperture grille CRT.

Picture impairment minimized

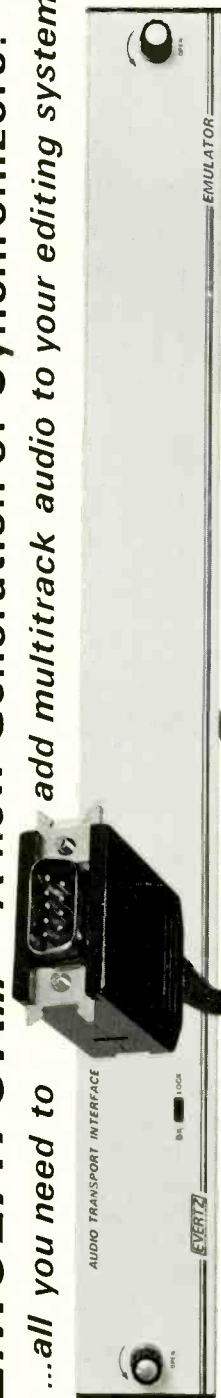
When a CRT display looks smoky or blotchy on portions of the raster, most commonly along the corners, the phosphors and mask holes are not of identical size. The precision of phosphor stripes and uniformity of the black matrix on the Sony CRT minimizes this impairment.

The shadow mask, by design, limits the distance between holes so that the R, G, and B signals from the beams do not overlap the black matrix. The curvature of the shadow mask holes, however, jeopardizes the regularity of the beam and phosphor shape. It limits the

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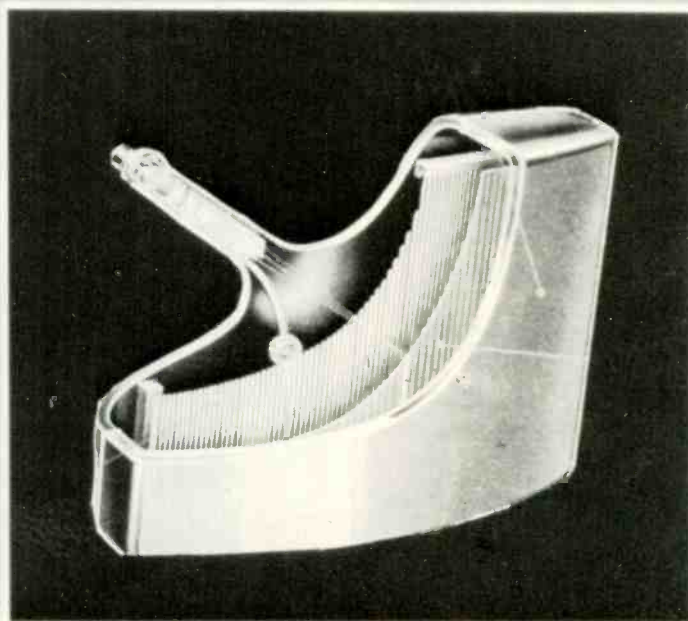
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TEST & MEASUREMENT

Conventional Picture Tube



full beams from passing through the mask, reducing resolution or inducing the R, G, and B signals to overlap the black matrix, producing blotchiness.

The faint shimmering pattern known as moire varies with the beam angle relative to the phosphors. The aperture grille made by Sony has an advantage over the shadow mask in minimizing this effect. The phosphor stripes are straight and at right angles to the horizontal writing beam, so interference patterns are minimized.

The delta phosphor structure, however, introduces the potential problem of angularity due to the triangular configuration of beam spots and phosphor spots, increasing the potential for moire.

For a broadcast monitor to be used as a true reference monitor, or to accurately match another CRT, the black level must be highly stabilized. Many manufacturers specify black level drift of RGB signals in the video circuits within one percent before the video signals reach the CRT. Once the image is illuminated on the CRT, however, physical characteristics of the CRT—such as

gases released from heat, and aging changes—come into play, so stabilization can be jeopardized.

Although most manufacturers incorporate precision clamp circuits into the video processing circuitry, this does not guarantee control of the dc levels portrayed on the CRT itself. Sony, however, took into account both voltage changes in circuitry and CRT drift with the BVM-1900 monitor series. A reference pulse of current is introduced and is constantly compared to the black level.

Last year Sony adopted the SMPTE Group C de facto standard of tight phosphor color tolerances, within 0.005, which increases the ability accurately to match colorimetric characteristics from other CRTs. This, in turn, helped realize further advances in monitor setup.

The new automatic setup introduced at NAB was made possible because the new colorimetric tolerances improved manufacturing consistency as well as performance. By conforming displays, the automatic setup feature could accommodate the matching of a Sony

TV test equipment from the inventors of the Plumbicon® tube.

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Philips, of course.

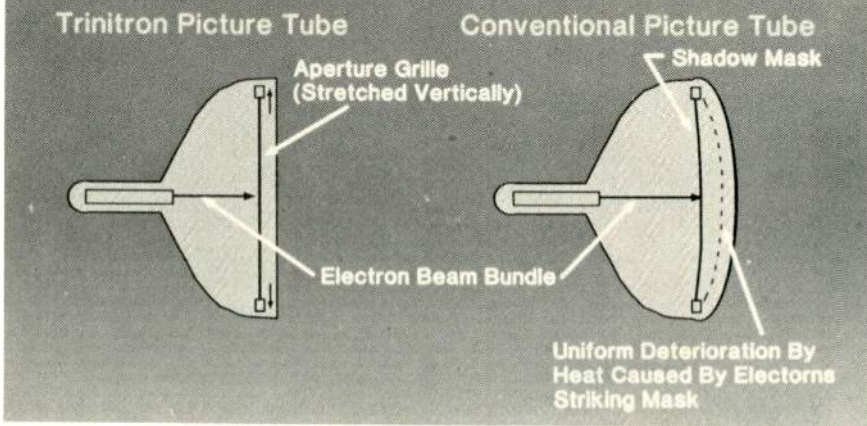


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The tightly stretched aperture grille (left) is less prone to distortion than the shadow mask, which may be bombarded by stray electrons.

display system to others on the market. The microchip technology developed for automatic setup also stores in-

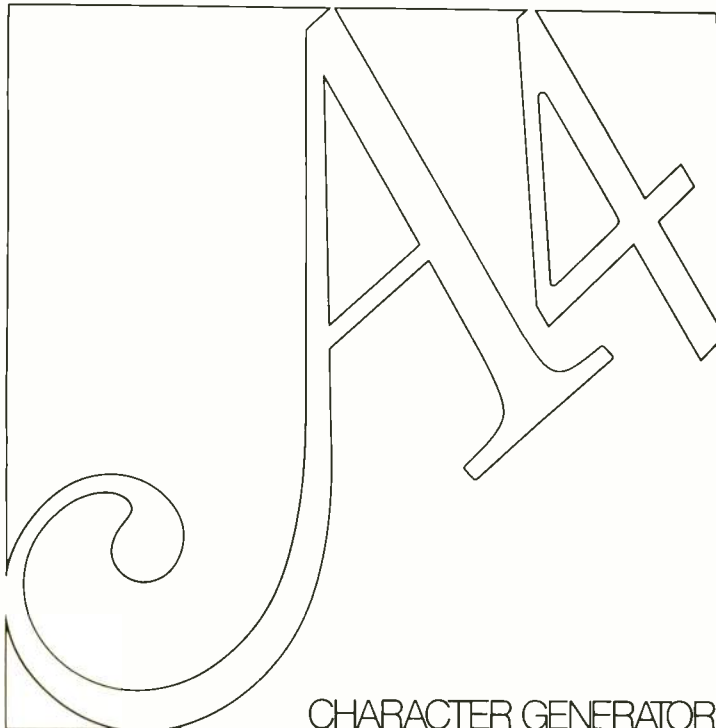
formation so that Sony monitors can be slaved to other display systems. If the gamma is distinctly different from one

CRT to the next, then the automatic set-up brings these parameters within a reasonable range for fine tuning adjustments. Built-in references also provide the engineer with a basis of comparison. The system's ability to store three new references allows the user to adjust the monitor to more subjective requirements.

This and other advances in CRTs are finally bringing users the truly transparent monitors needed for critical evaluation of picture elements. With improvements in performance and reductions in price, the industry has all the advantages of high-resolution CRTs. The high quality of broadcast cameras and VTRs now can be demonstrated with highly evolved display systems. Now more than ever before, the monitor has become a strong link in the video chain.

BM/E

Larry Thorpe is director of studio products for Sony Broadcast Products



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Q. If Microdyne's Ku-band downlinks are so good, why can they cost \$30,000 less?

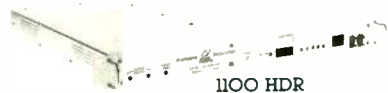
A. Microdyne's 5- and 7-meter dishes are precise, broadcast quality antennas providing up to 57.7 dB of gain and more than 10 years of service life. The telephone industry has run field tests which prove that top quality fiberglass antennas in outdoor service are unsurpassed in performance.

A manufacturer of metal antennas cannot escape expensive tooling if his goal is quality approaching that of Microdyne. Amortizing the dies, jigs and molds is a heavy cost which must be passed along to you, the buyer. Therefore, a Microdyne downlink can save you as much as \$30,000 because fiberglass is a superior material.

Q. How much experience with Ku-band installations does Microdyne have?

A. We are among the pioneers of Ku-band technology. We have supplied the

receivers, antennas and support equipment for a major electronic manufacturer's nationwide teleconferencing



1100 HDR

network. We've been supplying uplinks and downlinks for as long as there's been a commercial Ku-band market.

Q. What organizations and broadcasters have actually purchased Ku-band equipment from Microdyne?

A. CONUS, Dalsat, Florida News Network and all the other major satellite news gathering networks, plus a growing number of independent TV stations.

Q. How much flexibility do I get, in bandwidth and frequency?

A. Microdyne downlink electronics offer virtually unlimited access to any

satellite signal. Microdyne's newest 96-channel receiver with plug-in programmable modules is capable of receiving Ku- or C-band, and has dual IF bandwidth filters for half or full transponder reception. Whatever you want to do with Ku-band, Microdyne can find a way to help you do it, without destroying your budget.

Q. How can I get more information on Ku-band downlink systems by Microdyne?

A. We've put together a small folder which contains a big collection of facts and performance figures of Microdyne antennas and electronic hardware for Ku-band. Just call us at (904) 687-4633 or write for all the facts on these products.



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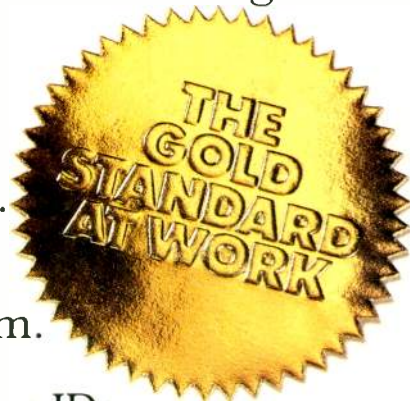
At WDBJ, Roanoke, commercial delivery has improved dramatically. So has the picture quality of the spots.

Carl Guffey, director of operations, reports: "The sales staff is happy, traffic is happy, the engineers are happy and the general manager is ecstatic."

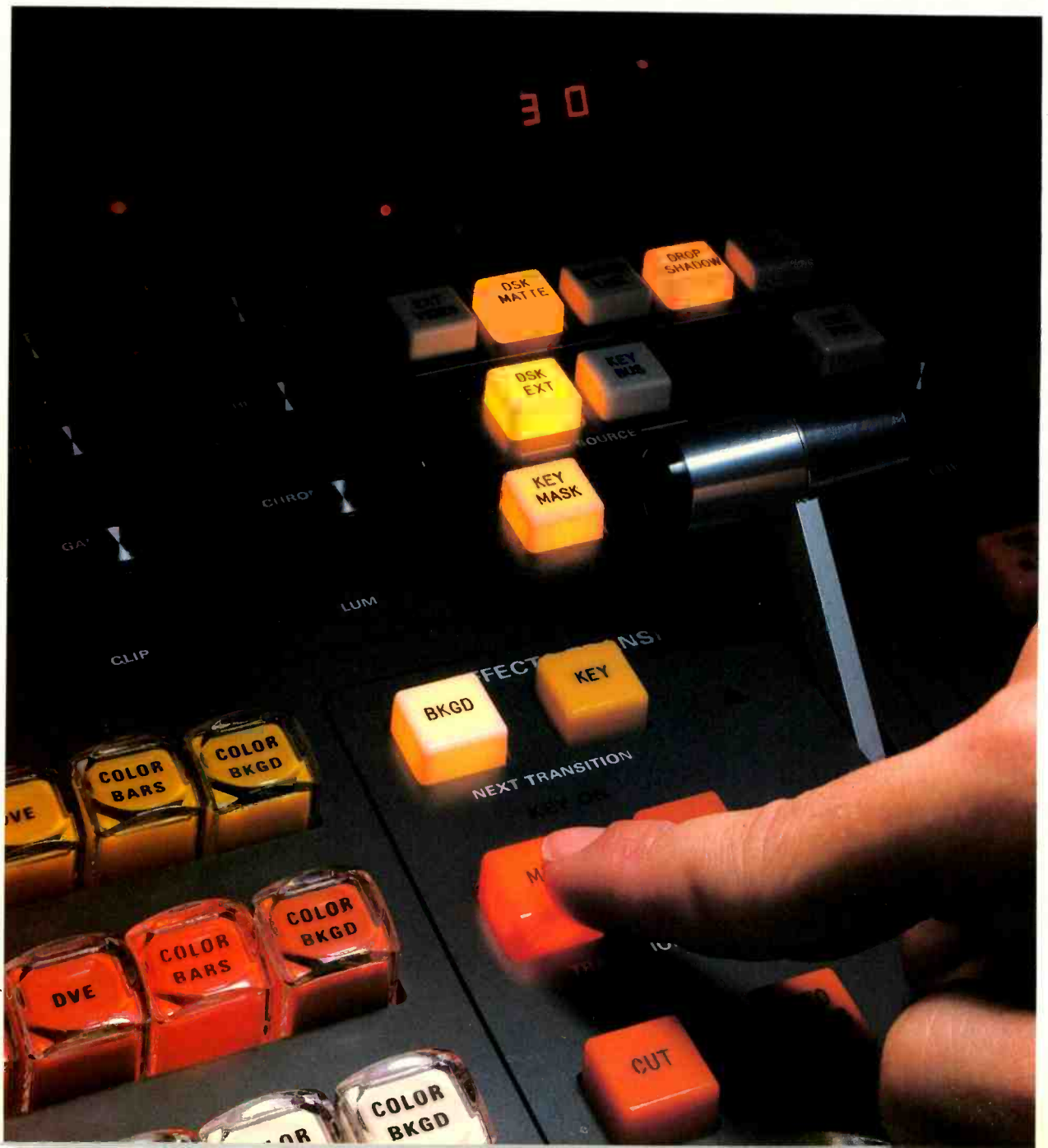
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STATION AUTOMATION:



WHO'S IN CONTROL?

By Eva J. Blinder, Senior Editor

From master control to traffic to commercial compilation, automation is taking over at television stations. But what system will emerge as the hub?

The television industry, which began to glimpse the Automation Age 20 or more years ago, has rounded the corner and emerged into the sunshine. The glare from the varied and often competing systems may be causing a few broadcasters to squint, however, in their efforts to determine how to fit the various systems together for greatest advantage.

While there are many reasons for automating a station, the bottom line most often cited is *accuracy*—a cornerstone of profit for commercial stations, and insurance against channel switching for all. Most likely, a station will realize few, if any, savings on personnel even after automation. Last-minute schedule changes and the possibility, even remote, of equipment failure, make a master control operator essential. Employees may find their jobs streamlined, but ultimate savings from automation come from its ability to eliminate the human error that often creeps into manual operation.

As many stations have found, the higher the degree of automation, the lower the error rates. Thus, automation eases operations in both master control and traffic; if the two systems can talk to each other, however, efficiency is optimized even more. The daily schedule prepared by the traffic system can go directly into master control without keystroking and the attendant possibility of error; after air time, an accurate log, reflecting any changes and comments, goes directly back to traffic, simplifying billing.

For many small- or mid-sized stations, a multitransport on-air cart playback system, such as the new MERPS decks, may provide all the automation capacity needed for streamlined operation—especially if all programming and commercials are aired from tape. Some of these systems have impressive programming capability—for example, RCA's Silverlake, which can handle 93 continuous hours of playback, or Asaca's ACL-6000B, with its 600-cart capacity. If the station needs to put a telecine or a live studio on air, however, a switcher-based system will be needed, although the cart system may still air much material.

Another attractive automation option is the commercial compilation system, designed to automate the creation of a spot reel, now done manually at many stations. These systems include the Pegasus 5100, distributed by A.F. Associates, and SPOT, to be launched later this month by Dubner Computer. They replace (in the case of Pegasus) or remove from the air (SPOT) aging quad cart machines, sharply reducing commercial failures and the associated revenue losses. (For some interesting figures on lost commercials, see sidebar.) The commercial breaks, programmed in advance, can then be addressed as individual events by master control.

Integrated automation

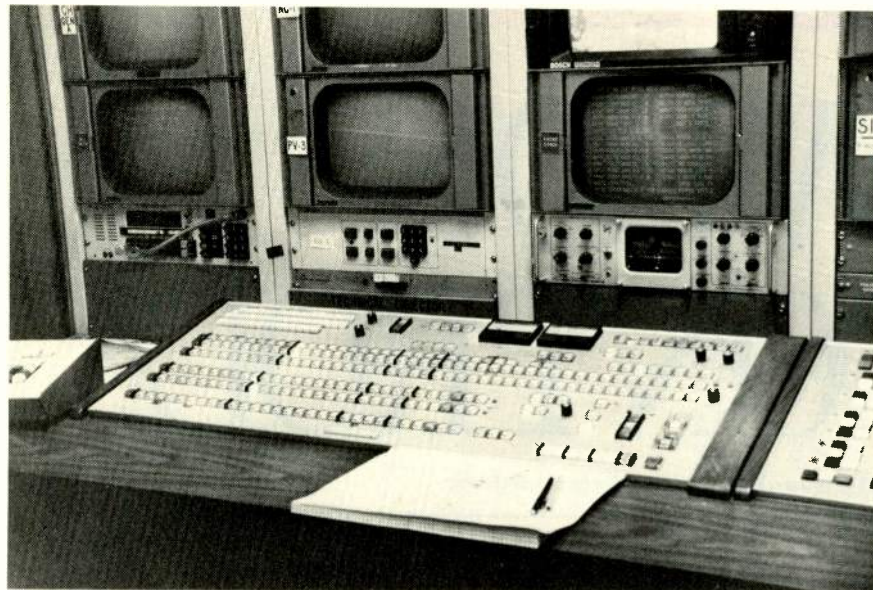
A good example of how automation can be fully integrated into a broadcast

operation is that of Group W. According to Group W's John Watson, who works out of KYW-TV, Philadelphia, the heart of the automation is in master control. As he puts it, "Master control is the controlling computer [of the system]. Other devices are connected to it, they have intelligence, but the control point is master control."

One of the main input hubs for KYW's automation system is outside the station itself at Westinghouse's Connecticut-based traffic computer. This group-wide system, with Westinghouse-written software, is shared by all stations in the group. Sales staff from the station call in for information on avails and to report sales; the system then generates daily logs that are fed directly into master control via a dedicated bidirectional communications system. Besides streamlining operations, this method sharply curtails the possibility of human error.

At all points, station operators have the option of overriding the automation system and intervening in the event of unforeseen circumstances. According to Watson, operators can enter changes in the base file even after airing, to explain any changes that may have occurred. This information is then transmitted back to the business computer, which uses it to send out invoices.

According to Watson and others, the key to the new era of station automation is the wide degree of computerization now encountered in broadcast equipment. Watson continues, "As more



Metromedia's WNEW-TV in New York City uses CDL automation to program the station as much as three days in advance, including control of a film and tape facility in New Jersey.

and more devices are produced with microprocessors and a fairly high level of intelligence, obviously some part of the system has to be the controlling one or the master, and . . . that should really be the one which is best suited to be the master rather than the one that traditionally has had the most intelligence."

He adds, "In the past, computers were more expensive than they are now and would usually only be considered for big jobs or important functions." Now, he says, it's "no longer a matter of cost but of what is the most logical system.

"There is no one answer" to the question of what should be the controlling hub for an automation system. "Different kinds of operations work better with different kinds of control," Watson states. A station that has a fairly intelligent random access cassette machine could use that as the hub, "but for stations that have several systems, it seems there should be some sort of master control system that controls them all."

KYW still airs spots directly from its ACR-25 cart deck, which is connected into the master control system with an ADA-type closed-loop interface. Watson explains that each cart contains ID material that can be recognized by the computer, which causes the assignments to take place automatically. If a tape is removed inadvertently, that information is reported to the computer, which automatically removes the assignment.

"In a manual system, if a previously

assigned cart is removed it's a problem," Watson says, "but with this kind of closed-loop assignment system those kinds of errors basically are eliminated."

KYW's master control automation system was bought originally from CDL in the early 1970s, and since that time Group W has "maintained and upgraded the hardware and software of that system to try to meet the changing needs of our station and prevent obsolescence," Watson says. "We're presently upgrading the computer part of the system . . . We have a commitment to an evolutionary process."

Machine control

Another station group with a longstanding interest in automation is Metromedia. Bill Kelly, vice president and chief engineer of Metromedia's WNEW-TV, New York City, says his station first got into automation in the 1960s with a system built by now-defunct Visual Electronics.

"We had two versions of that automation system," Kelly relates. "We started out with punchtape, then went to a punchcard system." Following the VE system, WNEW switched to its present extensive CDL automation, which has undergone extensive modifications during the several years it has been installed.

While master control is the central controlling point of the system, the traffic system located in the station's facility is extensively tied in and could even be considered the system hub, accord-

ing to Kelly. The business software runs on an IBM System 38 computer, which generates a log that is then dumped into the master control system.

Besides controlling machines in the building, master control also directly controls the station's film and tape facility, located across the Hudson River in Secaucus, NJ, via dedicated phone lines. The machine control allows the station to go on-air from any source, in New York or Secaucus, with equal ease. The Secaucus connection, not originally part of the automation system, was added as an upgrade when the facility became active.

In master control, a Digital Equipment Corp. PDP 11/15 computer with two hard drives and two removable hard disk packs runs the CDL automation software that, in turn, runs the station. Operators program the system about a day in advance, although occasionally (for example, before a long weekend) they may enter as much as two or three days' programming. Originally the system addressed WNEW's ACR-25 cart machines to air commercials, but since then the decks have been taken off the air and are used to create a spot reel on one of the station's Ampex VPR-2Bs. Each station break is run as a single event, although the automation system lists each event in a break separately to provide a complete log and allow for comments to be entered.

As part of WNEW's commitment to state of the art technology, the station is in the process of evaluating the automation system for a proposed move into the fourth generation. The station's extensive needs have made finding a manufacturer tricky so far, although Kelly is confident that the station will find a supplier. The main purpose for the upgrade, Kelly explains, is to stay on the cutting edge of technology.

"The architecture of the software and the things the software can do in today's computer capabilities wasn't available when the present system was built," Kelly notes. "Our present system is based on a minicomputer. Now, microcomputers can do things that minicomputers couldn't do then. Now it's easier to create modular software that's adaptable to changing situations. Now we can talk to switchers through a computer port."

Automation upgrade

Another New York station readying itself for a major automation upgrade is

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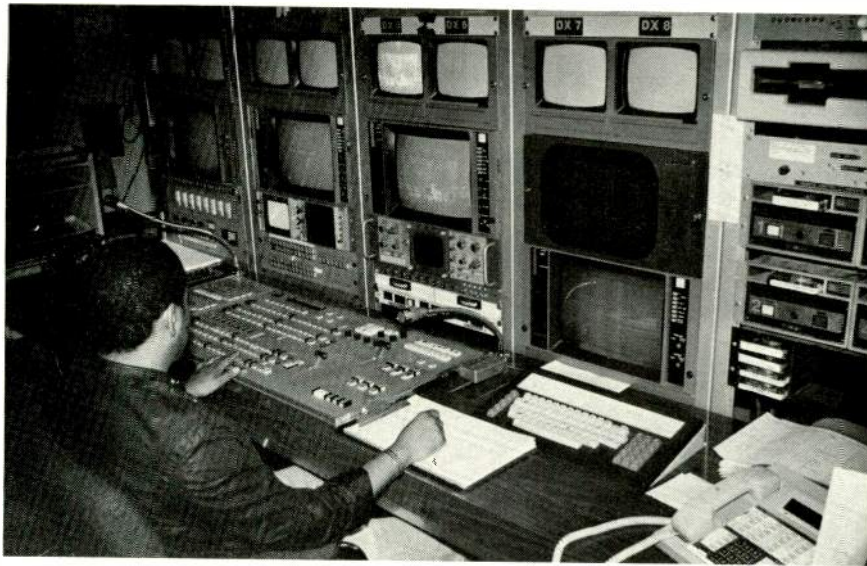
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In WPIX-TV's master control room floppy disks from the traffic department are plugged directly into the station automation system at right.

Tribune Broadcasting's WPIX-TV. According to assistant CE Earl Arbuckle, PIX has had three different generations of master control automation and is well on its way to the fourth. The current switcher is vintage 1967, controlled with a CDL APC-310.

Several years ago, Arbuckle relates, the station realized that some parts of the system were "falling apart" and needed replacement. VP of engineering Bob Murch and Harvey Dubner of Dubner Computer together designed a "stopgap" system based on a Dubner computer, a new typewriter-style key-



WPIX engineer Sheryl Leito uses the SPOT automation system, right rack, to copy quad material from the cart machines at her left onto BVW-40s.

board, and a pair of eight-inch floppy disk drives.

The next step was interfacing the traffic system, which was done by having the Dubner computer in the station's EDP department monitor the BCS business computer (the station has since switched to BIAS) and produce a disk that could be plugged into the automation system. (Arbuckle notes that adapting the computer to the new business system took only a few changes in coding—what the station calls a SMOP, or simple matter of programming.)

Because the computers in EDP and MC are identical, the systems are not only compatible but also redundant. A printer in master control produces the log; the system lets the operator enter comments as needed, and prints out only on operator command, usually about an hour after air time.

With this system, Arbuckle says, "The master control operator becomes a quality control inspector, as long as everything goes okay. If anything fails, of course, the operator is there to perform the job manually."

The biggest error problem the station faced, however, involved the quad cart machines used for airing commercials. The latest step in WPIX's automation plan was designed expressly to eliminate that problem area—without eliminating the cart machines themselves.

SPOT automation

Because Tribune Broadcasting has 11 TCR-100s—three of them at WPIX—replacing them would involve

a major capital investment. The failure rate associated with the machines was no longer acceptable to management, however, so Tribune's director of engineering, Otis Freeman, and Murch came up with the idea of SPOT, a computer-assisted breaktape system. Dubner's Rick Ilowite and Gene Spiller created the software and interface for SPOT, with WPIX's Guy Beverlin acting as project manager.

Essentially, SPOT has added four or five years onto the TCRs' lifespan by taking them off the air. Housed in the video control room, next to master control, the system consists of interfaces for each of the three TCRs, an equipment rack holding the computer, a small computer-controlled routing switcher, a character generator, monitoring equipment, and three Sony Betacam BVW-40 record/play decks. (Actually, the system could function with any RS-422-compatible deck as the record machine.)

A copy of the log disk from EDP, plugged into the system, rolls the TCR and records station breaks onto one of the BVW-40s two or three hours before air time. Operator approval is required for a break to be recorded; after recording, the operator verifies that it went correctly. One of the BVW-40s is always on-air, one standing by for air, and the third being composed; the system has room for a fourth if desired. A "green screen" monitor displays the log on the right side, with the status of the BVW-40s and TCRs, how far in advance the operator is working, and other information shown on the left. The keyboard allows remote control over the BVWs. To record a break, the operator loads the needed carts into their proper bins on the TCR (bin assignments appear on the log). Then, with the operator's okay, the system automatically runs the TCR and records the carts in sequence onto the BVW.

As already mentioned, the main advantage of SPOT for WPIX is to extend the useful life of the TCRs. The system has other plusses, however. With SPOT, there is no minimum length for events in a break; if an event is completed before the TCR has shuttled to the next cart, the computer simply waits for the cart machine to catch up. Before installing SPOT, station personnel "married" short tags and bumpers onto the ends of commercials to the tune of 50 or 60 a night; that activity has entirely ceased. A related advantage is that if one deck of one of the TCRs is down, the computer can as easily use

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Vital's SAM system at WLS, the ABC O&O in Chicago, has turned an on-air local control room into the station's focal point as it rolls tape machines, runs commercial breaks and picks up the network.

one deck of one TCR and one deck of another. And of course, the newer BVWs have a much lower failure rate than the TCRs. With each break scheduled as a single event, the number of errors has dropped dramatically. Tribune's WGN, Chicago, is planning to install its own SPOT system, and

Dubner will market the system to other stations.

The final step in WPIX's upgrade will be a new master control system. Arbuckle explains that rather than buying an off-the-shelf automation system, the station will purchase a state of the art CDL switcher with a remote-

control interface, which will then hook into the Dubner computer.

On-air operating log

A massive Vital SAM system is the hub of automation at WLS, the ABC O&O in Chicago. According to Joel Kresnicka, director of engineering, the system is tied into ABC's BIAS business system, located in Memphis, which generates the daily log and transmits it to Chicago via phone lines. The SAM computer then uses that information to create a complete on-air operating log detailing spots, station breaks, network programming, and everything else the station airs.

SAM has the further responsibility of rolling the tape machines, running commercial breaks, picking up the network—in short, running the station's entire on-air operation. An on-air local control room, known as TV 7, is the central control point for the SAM hardware and software. WLS's Vital switcher is also located there, as is the remote control for the transmitter. Although the station has a master control room, its duties are mainly concerned with network switching. TV 7 "is the focal point for WLS-TV," Kresnicka states.

For commercial breaks, the station manually records a composite reel on one-inch tape; this is then aired by

Lost Commercials Plague Broadcasters, Study Indicates

The quad cart machine and its attendant problems are the subjects of wide dissatisfaction among U.S. commercial television broadcasters, according to a study just released by A.F. Associates. According to AFA's Marc Bressack, who conducted the study, the results indicate that television stations lose over \$2.8 million in commercial revenues per week, nationwide, due to equipment failure.

The respondents, which represented 21.7 percent of all U.S. commercial television stations, reported an average of 8.05 lost commercials per week. More than half (54 percent) said they were dissatisfied with the number of lost commercials; of this number, those who indicated a dollar amount lost an average of \$3155 in revenue each week. Revenue losses among respondents who said they were satisfied with the

number of lost commercials averaged \$700. Significantly, 10.6 percent of respondents refused to comment on how many commercials they lost per week; 30 percent did not indicate the number of lost dollars.

Over half the respondents, or 63.9 percent, used quad cart machines (either TCR-100s or ACR-25s) for commercial playback; 25.9 percent of the total had more than one. Average age of the cart decks was 7.66 years, and the machines failed an average of 6.18 times per week. While the average time spent maintaining the decks was 9.2 hours, a full third of the respondents said that they spent over 10 hours per week on cart deck repair and maintenance, and 11 percent said they spent over 20 hours. In the last group, some stations spent 30 or even 40 hours a week maintaining

and repairing their cart machines.

According to Bressack, those stations with more than one cart machine, or that made a day reel or backup reel, reported a significantly lower percentage of lost commercials than the others. (Forty-one percent of the respondents made a day or backup reel.)

Interestingly, dissatisfaction over lost commercials was not limited to stations relying on quad cart decks, 60 percent of whom were not satisfied. Even stations using the newer half-inch on-air playback systems, however, reported a 30 percent rate of dissatisfaction. Respondents' comments on what they'd like in a commercial on-air system revealed several themes, including high reliability, low cost, standardized format, computer automation, and use of laser discs as sources.

Michael Ford

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SAM. "We'd like to automate our spot reels," Kresnicka says, adding that the station will do so as soon as Vital offers the option.

Post-production alternative

While many stations still see master control as the logical hub of station automation, that's not the only approach. According to chief engineer Ray Hernday, his station, WTMJ in Milwaukee, has put off revamping its automation system in favor of a major CMX 3400/GVG 1680 post-production installation. Nonetheless, Hernday has some thoughtful perspectives on the subject of automation.

"As the BIAS system was envisioned," he says, "the program log is made out with the actual switches—each switch is part of the information that the operator in traffic enters into the computer So machines are designated for each event. In effect, all the switching is done by somebody in the traffic department. The man back in engineering would make sure he looked at the CRT to see if something is coming up and take corrective action if a

machine is down. When you consider it from that standpoint, the traffic department is selecting what's going to be played. It's the input hub."

Phase two in such a system, Hernday says, is the master control operator who oversees what's actually aired. Digital machine control is a major asset here, he asserts. "Instead of hard wiring," he explains, "each control room has a control board with the capability of running any six or so tape machines. They are connected with a single coax, which goes back to the decoder that programs the machine for any particular studio at the request of the control room operator. That is one of the really difficult problems of the past—hard wiring. Now it's just a matter of assignments. The problem is that it's very expensive."

Digital control standards

With SMPTE nearing completion on its digital control standard, however, prices for such systems may lower as more and more manufacturers adopt the new standard. According to Dynair's Tom Meyer, chairman of the SMPTE

Subcommittee for Digital Control for Television, all four control specifications were expected to be published by last month. As already reported (see "Trouble at the Digital Interface," *BM/E*, November 1983), an increasing number of manufacturers are supplying equipment incorporating the new standard, which has also been endorsed by the European Broadcasting Union.

"The practicality of the standard is established," Meyer asserts. "I just came back from joint tests in Munich, where 14 manufacturers came with implementations. It was quite successful. We think this is the first answer. We have the first of several control languages, for VTRs, which Sony, Bosch, and Ampex have agreed to. We feel that this is 92 or 93 percent of the machinery that will be controlled on the bus.

"Elsewhere in SMPTE we have people working on a standard way to identify cassette cartridges so you know exactly what [a cartridge] is and what it contains. That will allow carts to be automatically identified. That's a very active group.

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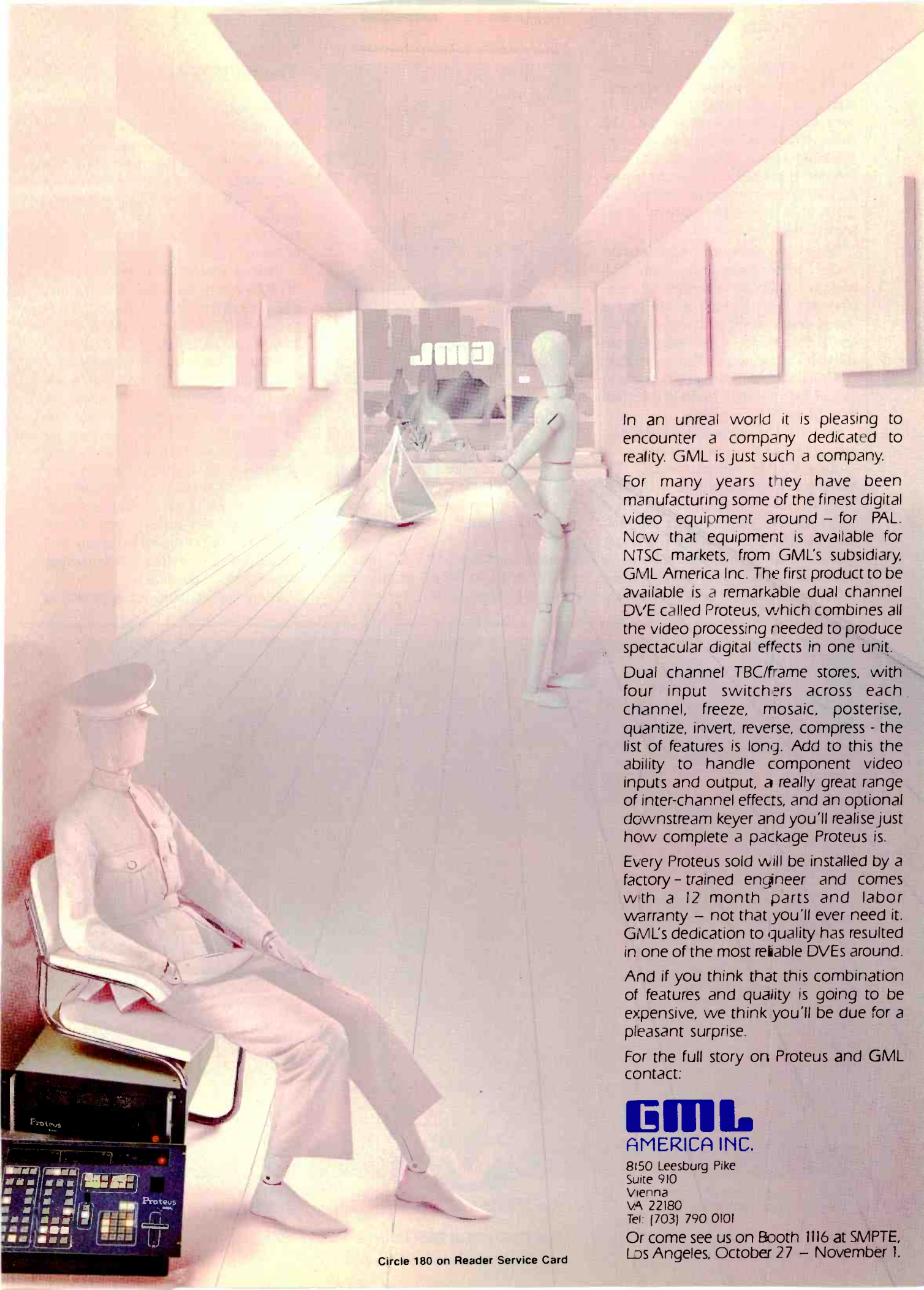
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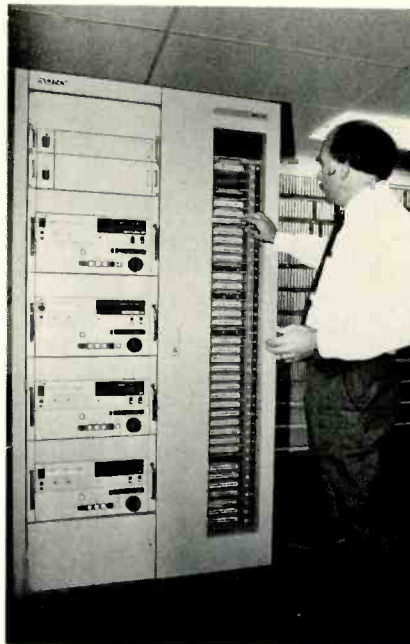
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Meyer continues, "they want automation to eliminate mistakes. The potential cost in personnel savings is somewhat of a secondary issue. The first test sites we've had with our own machine control system seem to bear this out. It has not acted to reduce people, but to make critical programs much more error-free and improve on-air presentation."

Some ideas about other directions for station automation come from Bob McIntier of Bosch, who says the company has been looking at utilizing a scaled-down, dedicated version of its Mach One editor with some custom software as an automation controller. "What a computer editor does best is to have a list of things to do at a certain time frame," he explains.

He adds, "A concept that is becoming very popular in television stations is to have a large routing switcher that handles all signals within a station. Then the master control switcher is a couple of buses in that system. You can assign whatever sources you'll be using for the next two hours to those buses on the routing switcher. All Bosch routing switchers and master control switchers



Jim Withers, director of station operations at KDNL, St. Louis demonstrates how the station's Sony Betacart has simplified his job.

have the capability of RS-232 interface with a computer board, so they adapt easily to external control."

The MERPS option

Meanwhile, manufacturers are busy coming up with systems to solve some or all the automation problems stations still face. Besides the major players in the master control/automation/routing game, such as Grass Valley, Utah Scientific, Vital, Bosch, and others, a variety of companies are vying for a share of the automation market.

Perhaps first to come to mind is the MERPS camp, including such companies as Sony (Betacart), RCA (Silverlake), Panasonic (MVP-200), and Asaca (ACL-6000B). All of these systems allow a station to program a significant amount of material in advance, and offer a highly integrated approach to programming. While the half-inch formats they use may be somewhat lower in quality than two-inch quad, the quality is in fact very high, and no one disputes their superior reliability and ease of maintenance. Lake System's LaKart automation package, which uses VTRs of any format, is another system that is finding increasing acceptance.

A somewhat narrower approach is

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taken by the commercial break compilation systems, such as Dubner's SPOT and Pegasus 5100, distributed by A.F. Associates. These off-line systems are ideally suited to the needs of larger stations with full automation systems since they streamline the production of a spot reel that is then addressable as a single event by the automation.

Unlike SPOT, Pegasus entirely does away with the quad cart machine, instead using a number of "bank tapes" as sources for commercials. Each commercial is identified by a unique ID, length, and position on the bank tape. The station's daily log is entered into the system's schedule editor, which produces an edit list delineating the order of the spots and specifying the separations between station breaks; time code calculations are made automatically by the system. The system then searches each bank tape in turn, starting with the most recent, and checkboards the spots onto their correct positions on the record tape.

To assist the station in keeping the bank tapes current, Pegasus incorporates a "transfer schedule" of new commercials and a "deletion sched-

ule," which codes redundant commercials to inhibit their use.

The heart of the system is the Pegasus computer, based on the Motorola 68010 microprocessor with a 20 Mbyte hard disk drive. It is addressed by a pair of video display terminals. One, typically located in traffic/sales, would be used to input and edit the schedule. The second terminal, in the VTR area, would be used to initiate, monitor, and control the execution of the daily reel. Each source VTR is controlled by a Pegasus ES77 electronic supervisor.

Commercial Communications, Inc., which has supplied many automation systems to cable companies, recently entered the broadcast market with its Stationmaster system (described in *BM/E's* June 1985 NAB Show-In-Print, p. 33). The latest wrinkle in the system is the ACV 2006 Verifier, which produces a complete hardcopy printout of every on-air event on a daily basis. The system consists of a clock, which interfaces directly with the computer to provide for automatic printout; a separate decoding chip for each channel, all contained on one PC board; the computer, which constantly searches

each decoder for inputs and prints the information out as soon as the printer is available; and the printer (an Epson RX-80 is standard).

Another new system, BSI's Newscart, is designed especially for on-air news automation. This two-channel, 24-transport playback unit can handle segments only three seconds long, and allows two channels of audio to be mixed and dissolved.

Clearly, the choices are many for broadcasters just automating a station, or upgrading a system of many years' standing. For large stations, master control still seems to be in control—but challengers are everywhere, and the industry cannot be said to have made up its mind. For smaller stations, automated playback systems like the various MERPS machines or LaKart may provide the perfect hub—but standardization remains elusive, and while interest is high, some broadcasters remain skeptical. With so many systems, and so many different station operations, perhaps no clear winner will emerge—but broadcasters are sure to find it easier to custom-tailor their automation systems to their needs. **BM/E**

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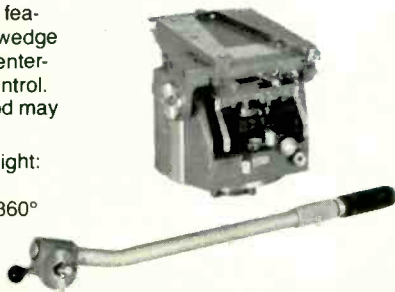
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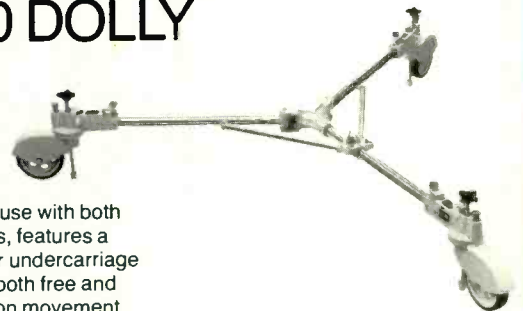
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THE TECHNOLOGY OF LENS DESIGN

Computer technology has helped advance lens design, but the immutable laws of physics and optics prevent breakthroughs—or do they? Here's an inside look through the iris.

By Eva J. Blinder, Senior Editor _____

What's in a lens? For most users, that's a question that's easy to ignore. In general, the inner workings of broadcast television camera lenses are sealed off from view, and the sophisticated optics inside remain a mystery to the average camera operator or engineer. Except for the most minor complaints, if something goes wrong with a lens, it can't be fixed at the station.

But the internal design of lenses—and the technology that affects lens design—are responsible both for breakthroughs and limitations in lens technology. Can lenses continue to get faster, longer, and lighter in weight indefinitely? To understand the answers, it is necessary to look inside the lens itself.

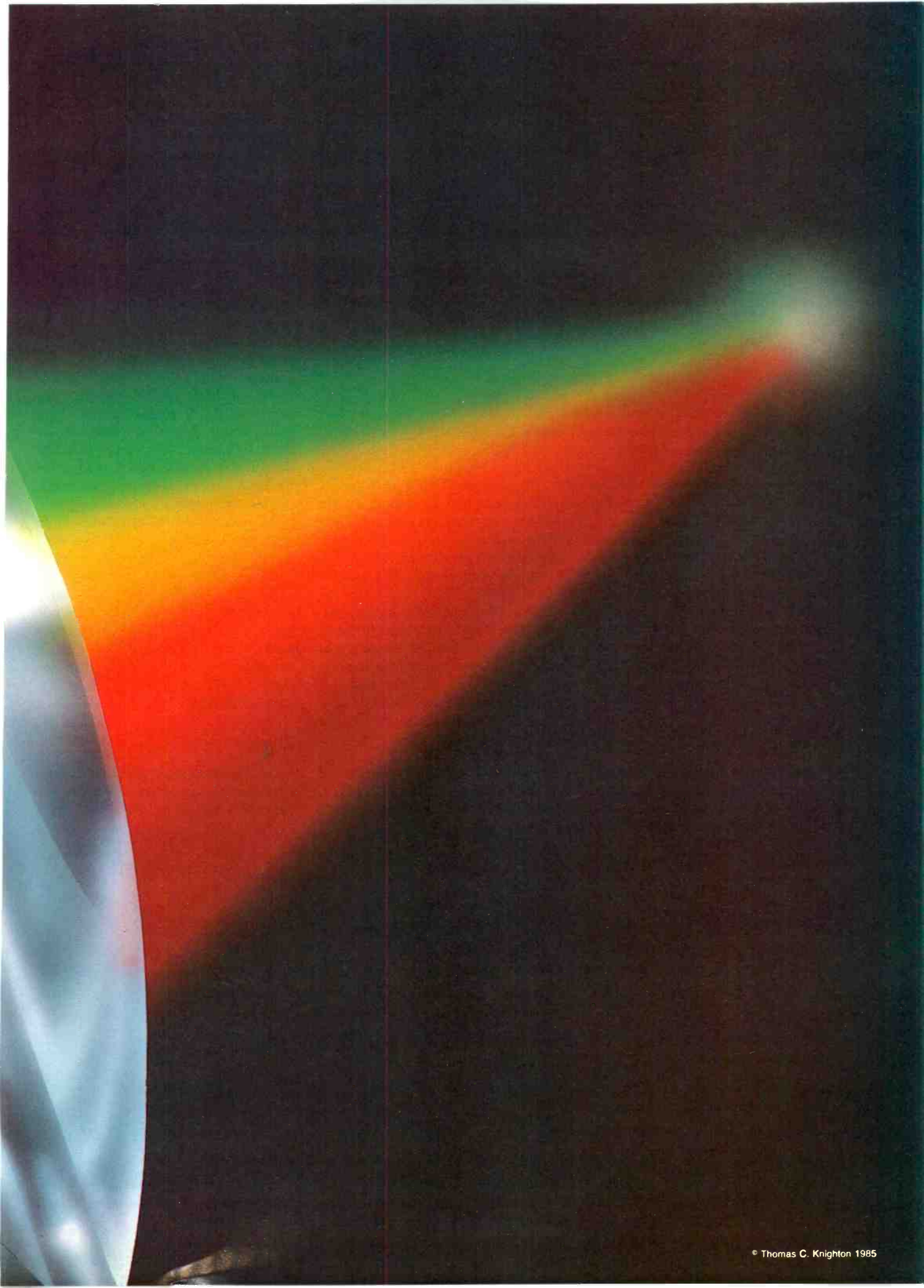
Lenses for video cameras adhere to the same general internal structure, whatever their speed, format, or zoom ratio. A varying number of *elements*, or single lenses, are arranged into three *groups*. The functions of the groups are standardized: the front group focuses the lens; the middle group, or *variator*, adjusts the zoom, and the rear group shrinks the image to the proper size for the camera's pickup tubes and optical system.

Within this basic structure, many variations are possible. Many shapes are possible for the individual elements, depending on their placement and purpose: convex, biconvex, and meniscus (concave) are among the most common. For each element, the radii of both curvature and thickness must be calculated carefully. Not only are the shape and thickness of the elements critical, but also the air spaces between them. And of course, the actual number of elements will vary with the type and purpose of the lens.

Another critical decision is the type of materials involved. Optical glass comes in many varieties, each with its own characteristics. These include dispersion, relative dispersion, and index of refraction, which varies with the wave length of light. Other important factors are spectral transmission and density. It is here where some of the tradeoffs inherent in lens design begin to appear. Optical qualities, while of paramount importance, are not the only factor lens manufacturers must consider in choosing glass. How much does the glass weigh? What is its cost? When can it be delivered? All these issues will affect the completed lens. Finally, the coatings used on the surfaces of the glass elements also affect the way the glass handles light.

In addition to optics, mechanical considerations also come into play in lens design. This is especially critical for zoom lenses, the mainstay of nearly all broadcast video operations. Any aberrations introduced by the movement of the elements during zooming will cause serious picture distortions. Other mechanical and electrical factors must also be taken into account, including the incorporation of pattern projection systems and the lens's ability to decode electrical signals from the camera.

Schneider's Ed Taylor comments, "For some time now, lens designers have had to account for test pattern dascopes. If these are integral in the camera, the lens designer has fewer problems than when the dascop is an integral part of the lens. Further, the lens elec-





Optical designers work at the CAD computer system in the Angenieux lens factory in St. Heand, France, southwest of Lyons.

tronic circuitry must provide particular information for the lens files in computer-controlled cameras."

That kind of information is becoming increasingly sophisticated, as illustrated by the lens Canon built for Hitachi's recently introduced high-definition TV camera. Because the camera has a complex, computerized registration scheme, the lens must be capable of continuously transmitting data on registration errors back to the camera head.

Pickup formats

Also affecting the design of the lens are the characteristics of the camera for which it is intended. Most obvious of these is pickup format. Because it is the function of the rear element group to reduce the image to the proper size for the pickups, it is this group that must change to adapt the lens to different formats. According to Tony Martinez of Angenieux, "While the image size of the pickup tubes has gotten smaller, there have been strong tendencies to require the same amount of energy on the sensor. For instance, most 25 mm cameras have lenses with an aperture of $f/1.4$, while 30 mm [cameras] have lenses open at $f/2$. The lenses are in fact the same except for a different rear optical group.

"However, as the nominal aperture gets higher, the light path in the prism becomes longer related to the image diagonal, and this may call for the more complex design of wide-angle or high-aperture lenses. Otherwise, there is no major difference in the design of lenses

for the various pickup tubes." Martinez notes that if a camera is more sensitive, requiring less energy from the lens, the lens can be made smaller while retaining good specs. He cites as an example Angenieux's 25X lens for CCD cameras.

Taylor points out that differences between tubes and solid-state pickups also affect lens design. According to Taylor, CCDs present the lens designer with "a whole lot of new problems, particularly with regard to high ratio zoom lenses." Not the least of these, he says, is optimization of back focus for the three primary colors.

"With tube cameras, the positions of the three tubes can be adjusted to achieve optimum back focus for red,

green, and blue," Taylor says. "This is not possible with CCDs, which are fixed to the beam splitter . . . Considerable attention has to be given to minimizing residual aberrations."

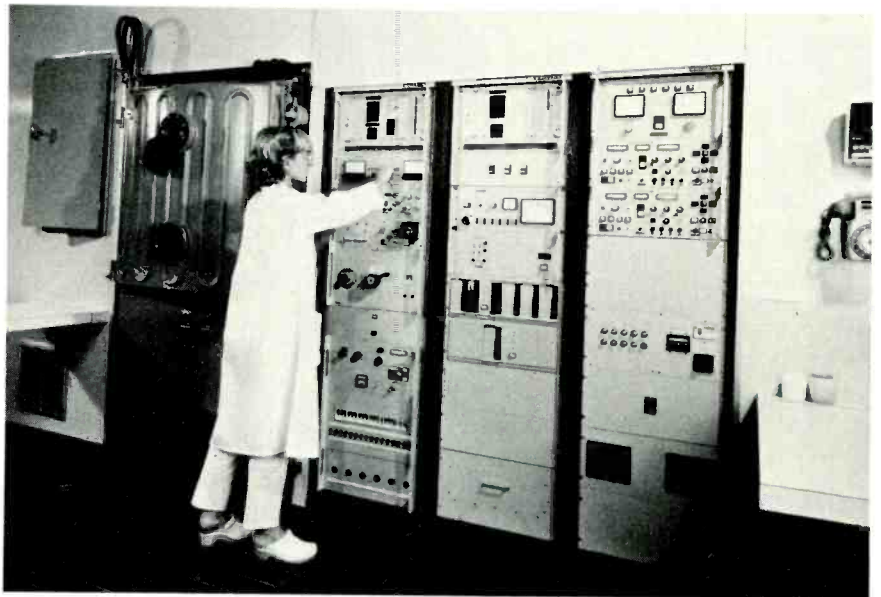
Jack Keyes of Canon concurs that CCDs pose some different problems. While the dynamic resolution of CCD cameras is very good, the camera cannot compensate for any errors, as a tube camera can. In addition, he says, because the chips are fixed in position, it is extremely important to reduce chromatic aberration to within very tight tolerances.

A spokesman for Fujinon adds, "Because the chips are bonded to the prism, you can't make adjustments as you normally can when you've got a conventional prism & pickup tubes. This makes it very difficult to control longitudinal chromatic aberration (a function of how parallel and close together the RGB lines are as they travel through the lens throughout its focal range).

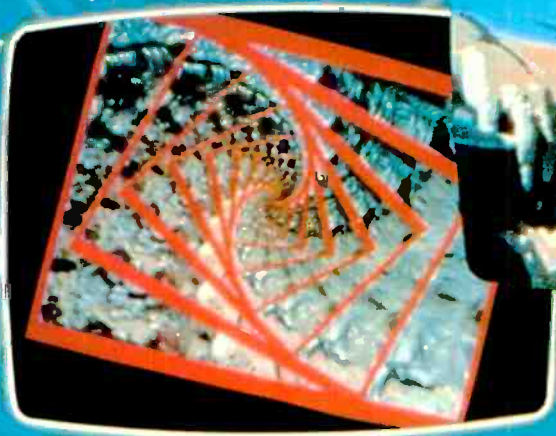
"Camera and lens companies have been fairly successful in dealing with this in conventional cameras," he continues. Current CCDs, however, are fairly limited in horizontal resolution, and demand for CCD cameras has not yet reached the point at which manufacturers would find it attractive to make a compatible lens/prism assembly designed especially for CCDs, the spokesman adds.

Optics

In addition to pickup format, camera optical systems also influence lens design. Martinez says, "The lens must



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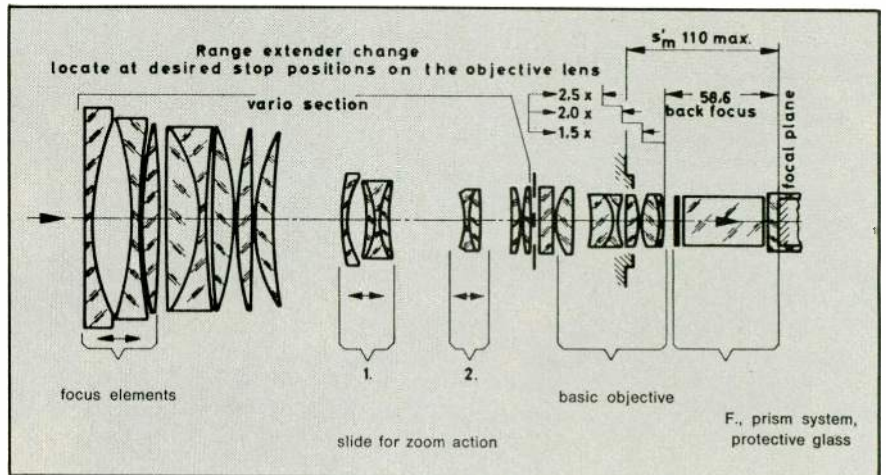
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... provide for space between the last element and image plane. In addition, the lens must be corrected for the type of glass [in the prism] and length of glass parts. The effect of the dichroic mirrors or prism faces varies with the angles of incidences of light. This must be taken into account to avoid colorimetry problems from center to the edge of the picture."

Taylor adds, "The introduction of a beam splitter prism behind the lens means a longer back focal length. Further, a prism in the optical path introduces its own chromatic aberrations, field curvature, and spheric aberrations, with their consequent effects on the final performance of the camera."

Keyes notes that lenses must be designed to compensate for and match the different indexes—i.e., wavelengths and optical paths—of the camera's prism or internal filters. "Therefore, even within the same lens model, the lens for each type of camera has a few different elements inside," he says.

Of course, the speed of a camera's optical system limits the maximum aperture of the lens. If the camera has an f/1.4 prism, putting an f/1.2 lens will



This diagram of the Schneider TV-10 1:2.1/18-200 lens with 11x zoom range shows the optical construction of Schneider's early studio lenses, which are still used by many stations. Twenty-two lenses are employed, six for the basic lens and 16 in the vario section. Newer Schneider lenses are based on a different design, of course, with flip-in extenders and test pattern diasopes.

be useless, and may even degrade certain lens specifications, especially sensitivity, resolution, and distortion.

Tradeoffs

Within the limits of lens design, tradeoffs often can be made to boost

one parameter at the expense of another. As with any such situation, however, those tradeoffs must be weighed against the intended use of the lens to insure that they enhance the lens's utility, rather than detracting from it.

For example, as the speed of a lens increases, its size and weight increase

Production Case



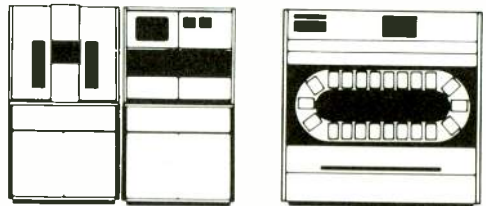
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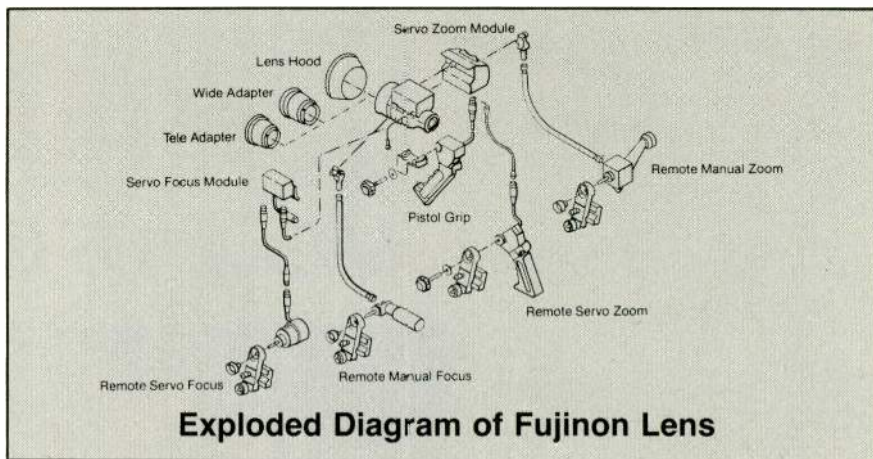
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also. This is in part because in order to let in more light, the lens must be wider in diameter. A longer zoom ratio also means a longer lens, since larger shifts are required in the variator group.

Another type of tradeoff is illustrated by the useful built-in zoom range extenders often found in broadcast lenses. According to Keyes, by extending the focal length, extenders also magnify lens aberrations and other problems. Therefore, they require that particularly severe tolerances be met for lens aberration and accuracy.

Ultimately, determining what tradeoffs should be made is a cost/benefit analysis based on the lens's intended use. For ENG applications, it is most important that a lens be light enough so that the camera can be carried on the operator's shoulder; focal length, though important, takes second place. Even if a camera is to be used on a tripod or dolly, balance is important. As studio and field cameras get smaller, they can easily be dwarfed by extra-long, extra-fast lenses.

Taylor cites Schneider's 30X standard lens for 30 mm tubes, which has an f/2.1 maximum aperture that ramps



to f/6.3 at its maximum focal length of 600 mm. "This could have been designed to be f/2.1 at 600 mm," he says. "But this would be of little value. The depth of focus would be such as to make it difficult for a cameraman to hold sharp focus, plus the weight of glass in the lens would be increased by a factor of 10 and the lens dimensions would naturally be increased to accommodate this Then, of course, who would be prepared to pay for it?"

As Taylor suggests, one of the major tradeoffs in lens design is price. Ac-

ording to Keyes, target cost is estimated at the beginning of development, according to the purpose and application of the lens. Then the lens is designed so that it can be produced at a rational and competitive price.

Ultimately, the improvement of lens specifications runs into the (so far) immutable laws of physics. Lens manufacturers agree that lens improvements can still be expected, but the dramatic breakthroughs are highly unlikely. The Fujinon spokesman says, "Improvements can be made in all of these [spec-

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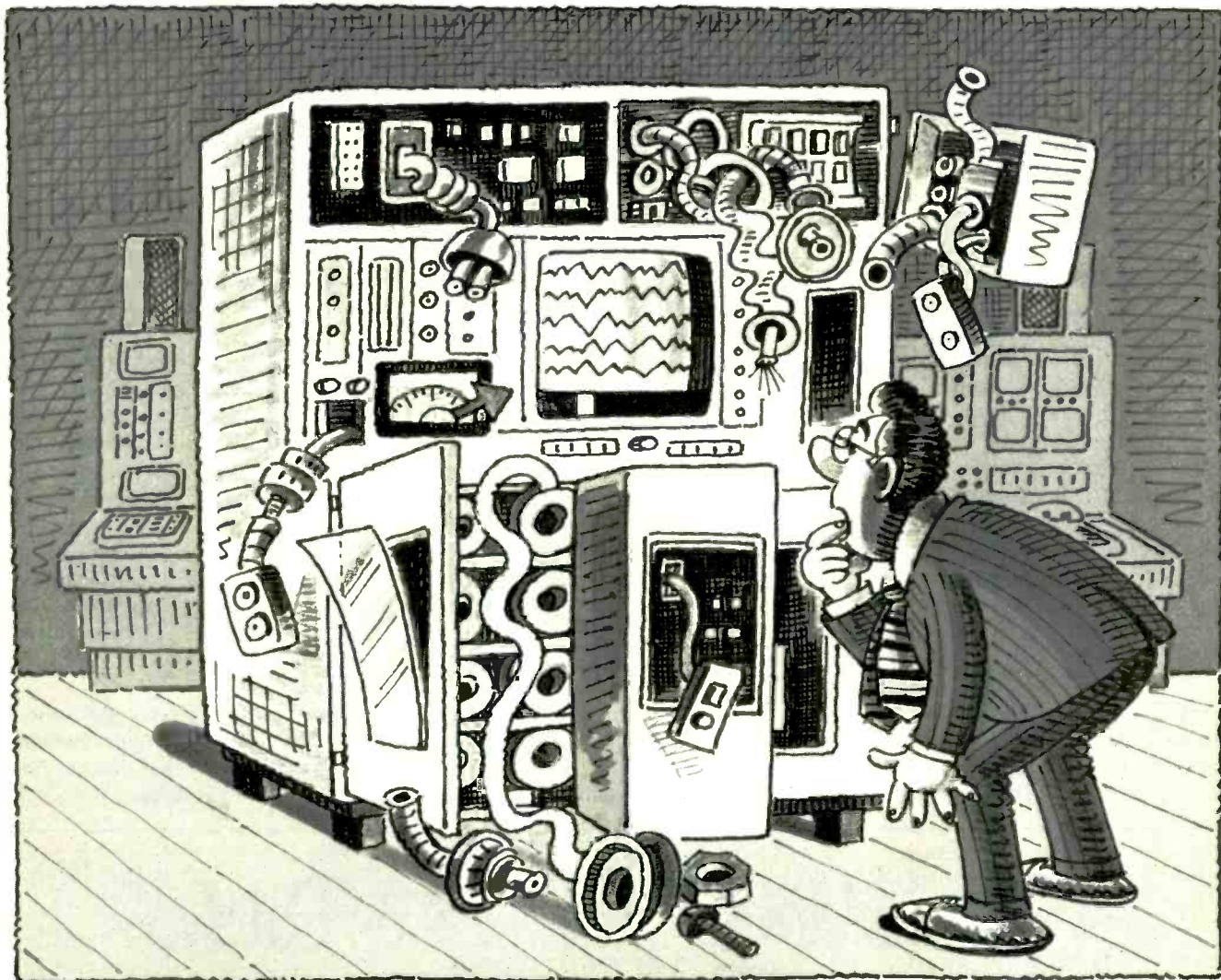
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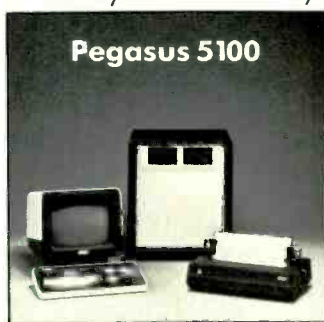
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ifications], but we're looking at incremental changes. There are not going to be any breakthroughs. The question then becomes a matter of price/benefit: Is the improvement worth the price? There are no finite limits as such, but we're getting to the point where improvements will be incremental and barely perceptible."

Several factors limit improvements, Keyes notes. These include the limits on the kinds of materials used in building lenses; physical requirements in building lenses of certain focal lengths and speeds; and limits on resolution caused by the laws of optics.

Changes may be small, but they will still occur. Martinez notes, "Improvements can still be expected because new optical materials are introduced from time to time, because optical design progresses thanks to accumulative experiences and more and more powerful means of computation, because new machining methods are available."

He adds, "We haven't reached the limits. This is a game of numbers . . . I'm sure you'll see longer lenses." As manufacturers strive to exceed each other in focal length for field lenses, so

are they racing each other for the widest angle in studio lenses.

Computing the changes

The complexity of lens design lends itself naturally to the use of computers, which have speeded the process for many years. "It's impossible to talk about lens design without computers," Keyes asserts. According to the spokesman, Fujinon has been using computer-assisted design for two decades and has had a dedicated lens design computer system for years.

"The implications [of computer design systems] are tremendous," Martinez states, "as tedious tasks are done without effort and without errors by the machine, freeing the engineer's time for creative tasks. We are also using a number of machining centers controlled by computers," which make parts impossible to make by any other method.

Taylor adds, "Their particular value is in higher precision, the ability to simulate different design approaches permitting a faster, more sophisticated design process, and, one could say, digitizing mechanical design."

What's ahead?

Even though no major breakthroughs appear to be around the corner, lens makers are aware of user needs and desires. The manufacturers suggested several possible areas for improvement, although all cautioned that some changes are years off at best. As Martinez puts it, "Presently available TV lenses have reached a very high level of quality and sophistication, quite well matching camera performance. By and large, operating characteristics, such as focal length, aperture, minimal focusing distance, etc., are in line with cameramen's requirements . . . We believe there now is substantial room for improvement, and we expect to show a new family [of lenses] in the future."

Taylor comments, "The lens designer's number one daily task is an ongoing process." He lists minimizing of residual aberrations, especially geometric distortion, as one of the top priorities.

According to Fujinon's spokesman, "the most looked-for improvements would probably be a lens that has zero light loss and no ramping. There's no

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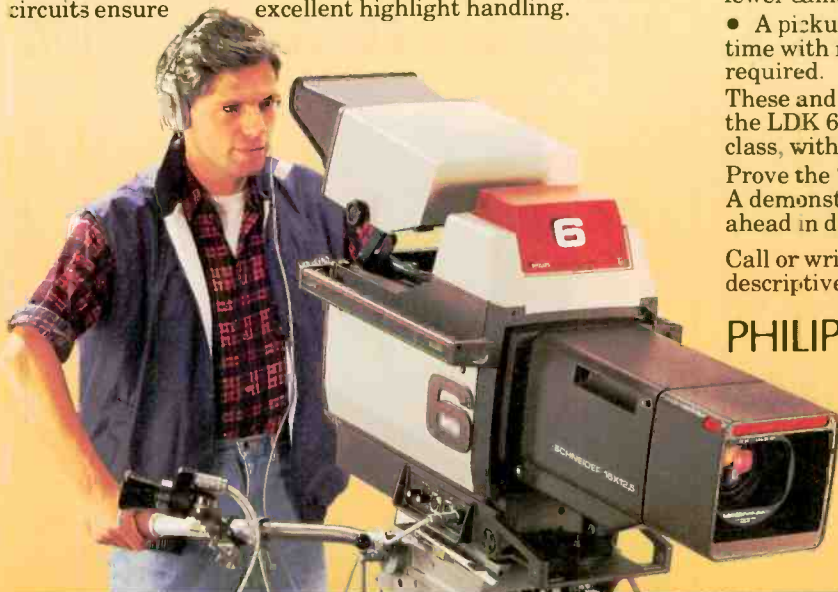
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way of guessing when anything like that is even possible. It just takes more and more pieces of glass to improve the properties of a lens, and as you add each piece it also adds complications."

Keyes suggests several improvements that might come to pass, for example, the use of germanium-type aspheric lenses with inherently greater registration and light transmission; lenses with more autofocus capabilities; and even plastic lenses, which would be both smaller and lighter. He points out that glass has many inherent advantages over even the most advanced plastics, including resistance to scratches and to extreme ambient temperatures, but plastic resists breakage and is of course very lightweight. Don't hold your breath waiting for a plastic lens, however; all these changes, if they come at all, are a way down the road.

Standardization?

One change that may be on the horizon is a degree of standardization between lenses. SMPTE's Working Group on Lens Interface Parameters,

headed by Phil Godfrey of ABC Television, "is working to develop electrical and mechanical interface standards between cameras and lenses so that ultimately we could have interchangeability between different lenses and different camera manufacturers," Godfrey says. Comprised of users, lens manufacturers, and camera manufacturers, the committee is attempting to bring all three factions together to arrive at a workable compromise.

According to Godfrey, the working group is studying camera and lens specifications to determine the differences and similarities in electrical specifications. "Some camera manufacturers supply ac and some supply dc. Some supply lower voltages, some higher voltages. We're trying to arrive at some commonality We're striving more for a recommended practice than a standard."

The group is also trying to come up with a recommended lens mount, although this may be even more difficult since it directly infringes on camera design in areas such as back focal length and mechanical design. "If a standard mount was realized, however,"

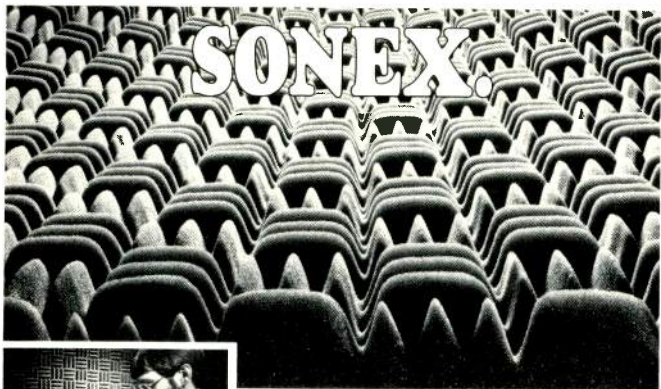
Godfrey contends, "we could develop an electrical interface box to take care of the electrical differences."

Whether the group will achieve standardization in an area where mechanical and electrical specifications are so varied and entrenched remains to be seen. A representative of one lens manufacturer active in the group suggested, "We may agree to disagree." Godfrey is well aware of this possibility.

"If we can't come up with a recommended practice," he says, "then we'd publish the specifications that major manufacturers use" in a tutorial-type paper in an attempt to obtain a de facto recommended practice. The working group has been in existence for three years—not particularly old for a standardization committee—and most of the major lens and camera makers have participated in its efforts, according to Godfrey.

As with improvements in specifications, standardization most likely will prove to be an evolutionary, not revolutionary, process. Progress is certain to continue, however, as lens manufacturers and the industry itself strive for greater perfection. **BM/E**

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AES CONVENTION EXPANDS

Increased numbers of participants and technical papers have prompted the Audio Engineering Society to expand its annual convention from four to five days. The seventy-ninth AES convention will meet October 12 through 16 at the New York Hilton, with 60 technical papers and 20 seminars and workshops presented over the five-day meeting.

In addition, a two-day special program will focus on sound reinforcement, which has become a topic of special interest to participants.

Other important topics generating interest at the AES Convention this year will be, of course, digital audio and audio for stereo TV.

The exhibit hall will be open for four days, from Sunday, October 13 to Wednesday, October 16, and will feature over 300 displays with 40 on-site demonstration areas. Exhibit hall hours will be 1:00 p.m. to 6:00 p.m. Sunday, 10:00 a.m. to 6:00 p.m. Monday, 10:00 a.m. to 5:00 p.m. Tuesday, and 9:00 a.m. to 1:00 p.m. Wednesday.



An increase in participants and papers over last year's AES Convention has expanded this year's show to five days.

Program Highlights

Below are some of the more noteworthy seminars and workshops scheduled for this year's expanded AES Convention.

Saturday, October 12

8:30 a.m. Annual Business Meeting
9:30 a.m. - 12:30 p.m. Acoustic Fundamentals seminar
1:30 p.m. - 4:30 p.m. Small Room Acoustics seminar
5:30 p.m. - 7:00 p.m. Large Loudspeaker Arrays workshop
Technical Papers -
Transmission - Recording
Broadcast
2:00 p.m. Session I - Digital Recording
7:00 p.m. Session II - Analog Recording and Broadcast

Sunday, October 13

9:30 a.m. Audio for FM Broadcasting workshop
Wireless Microphones workshop
1:30 p.m. The Business of Audio

for Stereo TV workshop

Monday, October 14

9:00 a.m. TV Audio Production Mastering workshop
Aspects of CD Mastering workshop
Technical Paper - Transducers
9:00 a.m. Session I - Transducers
Technical Paper - Transducers
1:30 p.m. Session II - Transducers
Technical Paper - Transducers
7:00 p.m. Session III - Transducers

Tuesday, October 15

9:00 a.m. Tape Machine Clinic workshop
Psychoacoustic Fundamentals seminar

Technical Paper - Signal Processing

9:00 a.m. Session I - Processing
Technical Paper - Signal Processing
1:30 p.m. Session II - Filters
7:00 AES Awards Banquet - Reception
8:00 AES Awards Banquet

Wednesday, October 16

9:00 a.m. Microphone Techniques workshop
Phase relationships seminar
Technical Paper - Signal Processing
9:30 a.m. Session III - Mixing and Equalizing
1:30 p.m. Education in Audio seminar
From Fourier to Hilbert and Back Again seminar
4:00 p.m. Convention Close

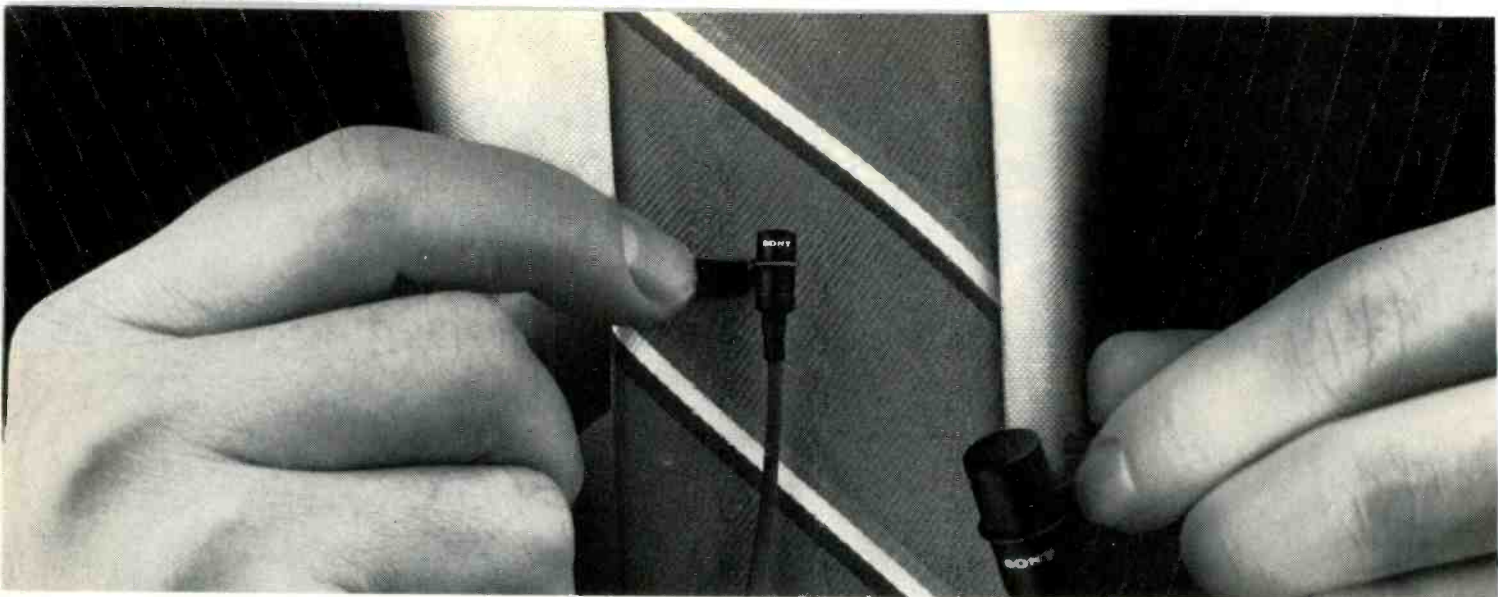
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Audio Precision
Audio Productive
Audio-Technica U.S.
Audiotechniques
Audio Video Consultants
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Cipher Digital
Connectronics Corp.
Countryman Associates
Crest Audio
DCS Audio Products
Design Direct Sound
Digital Entertainment Corp.
DOD Electronics
Dolby Electronics

King Instruments Corp.
Klark-Teknik Electronics
Kurzweil Music Systems
Lenco, Electronics Div.
Lexicon
Lumitrol Corp.
3M/Magnetic A/V Products Div.
Magnefax International
Marshall Electronic
Martin Audio Video Corp.
Meyer Sound Laboratories
Micro-Point
Mitsubishi Pro Audio Group/see
Digital Entertainment, Quad
Eight/Westrex
Monster Cable
Nagra Magnetic Recorders
Nakamichi U.S.A. Corp.
Neotek Corp.
Rupert Neve Inc.
New England Digital
Orban Associates
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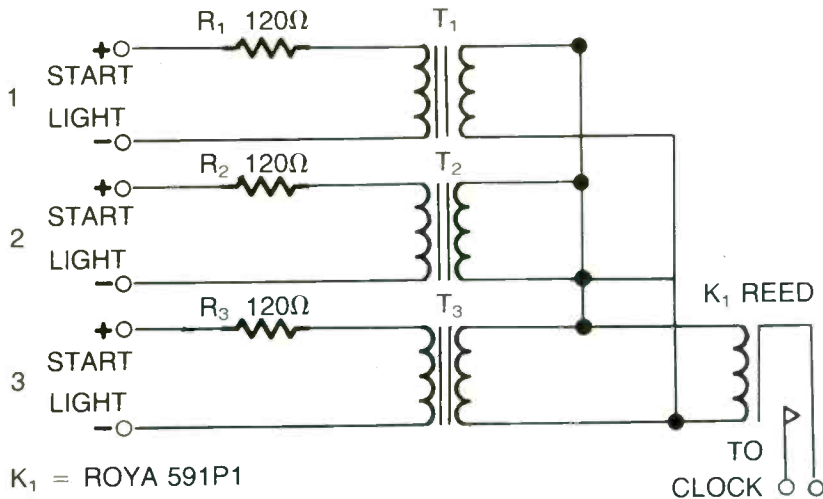
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GREAT IDEA NOTEBOOK

Automatic Digital Spot Timer



$K_1 = \text{ROYA 591P1}$

By Stephen Lampen
CE, KJAZ
Alameda, CA

Our PD asked me to build a digital clock that would time our commercial spots on air. He wanted to be able to see when spots were almost over, or when a spot ran too long.

Unfortunately, most of the less expensive clock kits on the market, which cost around \$10, require that a switch be momentarily depressed to zero the clock and begin to count. In the interest of simplicity, I wanted to see if I could find a way to interface the clock-timer with our cart machines, which are ITC SP, without using a power supply and circuitry.

I began by taking the paralleled outputs for the "START" light in each cart machine into a transformer. That's 24 V dc into a transformer.

The turn-on of the dc produces a pulse of dc at the output of the transformer. While this pulse is low at about one volt, it's enough to drive a small relay. I used a reed relay which is very sensitive and will fire at about 0.5 volt. I picked up this relay as surplus, but any small relay will work as well. They often come in an IC 14-pin DIP package (as mine did), so one IC socket and three transformers will work fine.

I added 120 ohm resistors ahead of the transformer primary as the dc sees

only the resistance (not reactance) of the transformer, which in my case was about 50 ohms. I felt there was too much loading of the 24-volt supply in each cart machine (about 0.5 amp), and adding the resistor drops the draw to 150 mils, a more reasonable figure. It might also be possible to use transformers which have more resistance in the primary to get the same result. Usually the cheaper and smaller transformers have more resistance and work better, and using a step-up transformer will step-up the pulses so you have some reasonable pulse voltage to run the relay.

This simple design allows our clock-timer to be activated at the start of a spot. It's noteworthy too that the circuit completely isolates the three cart machines from each other. BM/E

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interpreting the FCC rules & regulations

The Ramifications of Must-Carry

By Harry Cole, FCC Counsel

You doubtless heard of the Quincy Cable decision that was handed down by a Federal appeals court in July. It is usually said that, in that decision, the court threw out the must-carry rules. While that is certainly not an unfair or inaccurate statement, it really does not reflect the full potential reach of the the court's opinion. What follows is an attempt to provide some greater appreciation for the possible impact of the Quincy Cable decision.

In order to understand any of this, you must first have a rudimentary grasp of the must-carry rules which the court did, indeed, throw out in July. Those rules, adopted by the Commission approximately 20 years ago, required cable television systems to carry the signals of all local television stations and certain nearby stations which are "significantly viewed" by residents served by the system. The idea was to make sure that local broadcasting did not suffer any disadvantage as a result of cable technology, which permits cable operators to import and offer to their subscribers the signals of distant stations and nonbroadcast programmers.

The Commission was motivated in part by pressure from the broadcast industry, and also in part by the Communications Act of 1934, in which Congress has clearly attached a very high priority to the concept of a local broadcast system assuring local service to as many individual communities as possible. With these factors in mind, the Commission adopted sweeping rules requiring, in effect, cable carriage of *all* local and significantly viewed signals. In so doing, the Commission did not have any empirical evidence demonstrating that, absent such rules, local broadcasting would dry up and blow away. Rather, the Commission was acting on the basis of what it thought to be a reasonable guess.

The must-carry rules have always been a source of annoyance for the cable industry, which has generally found them to be a restriction on cable operators' discretion to program their systems as they (and their subscribers) may see fit. This annoyance has been exacerbated in recent years as program sources—both local, over-the-air services and nonlocal, nonbroadcast services—have flourished. If, for example, a 12-channel cable system was located in a community which had nine or 10 must-carry stations, the cable operator could offer its subscribers only two or three nonlocal alternatives, despite the plethora of such services available. Further, some of the local must-carry services may have been poorly programmed stations in which the audience might have little or no interest; such stations would thus be less desirable—both to

the audience and, therefore, to the cable operator—than would, say, a premium movie channel, an all-music channel, or a "superstation." In selecting programming to be offered on a cable system, then, the must-carry rules have been an inhibiting factor.

Must-carry problems

Meanwhile, out in the state of Washington, Quincy Cable TV, Inc. was having its own problems with the must-carry rules. It had a 12-channel system, all 12 channels of which were being used. The community served by its system is located between Seattle and Spokane, and it thus carried the local stations of those two cities, even though that led to substantial duplication of programming. In 1979, after conducting a survey, Quincy Cable decided to remove from its system the three Spokane network affiliates, all of which could be received over-the-air, and to replace them with specialized cable programming. It requested a waiver of the must-carry rules, but its request was denied by the Commission's Cable TV Bureau. It appealed that denial and, while the appeal was pending at the Commission, it deleted two of the three stations. The FCC ultimately affirmed the denial of the waiver request and imposed a \$5000 fine on the cable operator for the deletion of the two stations.

Quincy Cable filed an appeal with the United States Court of Appeals for the District of Columbia Circuit. Although Quincy Cable represented the point of view of cable operators, the case clearly involved the validity of the must-carry rules. The decision—*Quincy Cable TV, v. FCC* (D.C. Cir., Case No. 83-1283)—was released on July 19, 1985.

As mentioned above, the court did throw out the must-carry rules. The court found that cable programmers and cable operators are entitled to First Amendment protection. Because of this, and because it also found that the must-carry rules substantially infringed that protection, the court subjected the rules to a much higher standard of scrutiny than is usually applied to Commission regulations. The bottom line was that, according to the court, the Commission had not demonstrated that an adequate justification for the rules existed. In the court's words, the must-carry rules were "grossly overinclusive" rules which "indiscriminately protect each and every broadcaster regardless of the quality of local service available in the community and irrespective of the number of local outlets carried by the cable operator." The court ac-



Lighting Tech Tips

THE PROBLEMS...

1. The bulk and complexity of conventional camera-mounted light/cable/battery systems interfere with a cameraman's mobility.
2. Because of this complexity and bulk, many cameramen will not use an on-camera light, even when it would greatly improve video quality.
3. Having a mixture of low voltage (12 or 30V) and AC powered bulbs is inconvenient, confusing and often results in bulb destruction.

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The Anton/Bauer UltraLight and UltraLight Power Adapter (ULPA) eliminate the extra batteries, dangling cables, and the overall bulk of conventional on-camera lighting systems. The ULPA allows the miniature UltraLight to be powered from the same battery that runs the camera. The ULPA merely snaps on between the camera's existing Snap-On® battery bracket and the standard Anton/Bauer Pro Pac® camera battery; the ULPA's built-in cable plugs directly into the UltraLight.



A cameraman can now have the full benefits of the most versatile camera light without sacrificing any speed or mobility. Moreover the highly efficient UltraLight will deliver a smooth beam pattern that draws as little as 1½ amps; that is well over one hour of running both light and camera simultaneously from one battery. There is no longer any excuse for shadowed eyes, sunken cheeks or muddy video.

When AC is available, it is not necessary to change the bulb. The UltraLight with the same low voltage bulb can be powered with the compact ULAC which converts both 120 or 230V (switchable) to low voltage for up to 100 watts. No longer is there the need to carry two or three sets of bulbs for different voltages or run the risk of accidentally destroying bulbs with the improper voltages.

UltraLight (patent pending) solves even more lighting problems. See Lighting Tech Tip #1 and #2.

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knowledge that the Communications Act clearly attaches a priority to localism; however, in the court's view the must-carry rules had not been narrowly designed to serve that priority without unnecessarily infringing the constitutional rights of cable programmers or operators.

The Quincy Cable decision has a number of interesting aspects over and above the deletion of the must-carry rules. For openers, it clearly accords First Amendment protection to cable programmers and operators. This is yet another series of recent court decisions firmly placing the cable industry within the scope of that protection.

Second, the decision gave the court yet another opportunity to emphasize its concern for the continued availability of locally oriented broadcast programming. That concern has recently been expressed in connection with the Commission's deregulatory efforts, which have eliminated minimum guideline percentages for nonentertainment and locally produced broadcast programming. Noting the Commission's rationale for the must-carry rules—i.e., that the rules are necessary to assure the availability of local broadcast programming—the court pointed out that a local station would be subject to must-carry protection “even if it carries no local programming at all.” To this observation the court added a footnote. In the footnote, the court cited the FCC's deregulatory changes and then stated that, “perhaps spurred by this change, several broadcasters have announced plans to provide a full day of music videos, programming that, of course, is devoid of any local orientation at all.” While we should not read too much significance into this footnote, the court's reference to music videos can hardly be described as charitable. This could signal a developing unwillingness on the court's part to provide further endorsements of the FCC's deregulatory policies to the extent that those policies result in a decrease in locally oriented programming. Such a development might, in turn, affect the programming plans of broadcasters seeking to duplicate the success of, say, MTV, by providing a full-time, all-music video format.

Third, there is the matter of copyright liability. Transmission of copyrighted material on a cable system constitutes a “use” requiring payment of a copyright royalty. The Copyright Act, however, excludes from this requirement cable carriage of local stations, i.e., stations subject to the must-carry rules. This arrangement certainly makes sense: why, after all, should the cable operator be required to pay copyright royalties for the carriage of a station which it is required by Federal regulation to carry? But, you might say, if the must-carry rules are deleted, the copyright exclusion should also be deleted. While that would indeed appear to make sense, the court in Quincy Cable did not agree.

This, in turn, has given the broadcast industry a focal point in its efforts to reduce the negative effects of the Quincy Cable decision. Obviously, television licensees subject to the must-carry rules certainly enjoyed the free ride on the local cable system which those rules provided. While the court indicated in its decision that the Commission might be able to formulate a set of must-carry rules that would pass constitutional muster, at the time of this writing most observers agree that the Commission is not inclined to go that route. After all, the must-carry rules were largely antithetical to the present FCC's strongly

THE IMPORTANCE OF MICROPHONE ACCURACY IN BROADCAST AUDIO



A distinctive voice remains as important to a successful broadcast announcer as a recognizable visual presence. Microphones are the critical first step in the broadcast audio chain. Acting as a highly accurate sound "lens," they must be sensitive enough to faithfully transmit all of the subtle personal nuances and inflections that distinguish one announcer's voice from another.

Today's sophisticated broadcast productions demand more from microphones. Differences in relative mic performance are more readily apparent, and an inferior microphone stands out like the proverbial sore thumb.

In the most basic sense, any microphone need only capture the sound source exactly and convert it to electrical energy — no more, no less. Obviously, microphones necessarily have different characteristics based on differing transduction technologies and designs. But at Beyer, we believe that the superiority of a microphone is in large part based on how accurately it transduces the source material — with no excuses based on

size or applications.

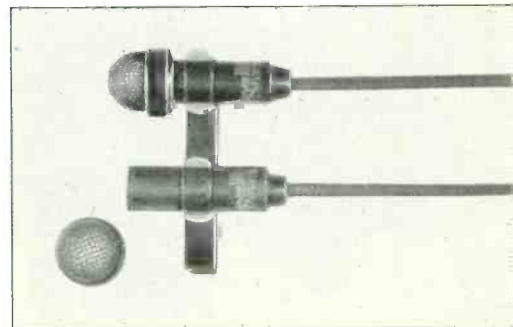
In broadcast, Beyer's concept of "accuracy" means the difference between a microphone that can focus in on a specific voice and produce a totally realistic, professionally acceptable performance, and a mic that simulates a performance by only capturing the bare outline or "silhouette" of an announcer's voice. We've dedicated the most complex and sophisticated technology in existence to reinforce the truth of this basic premise.

Sensitive and natural-sounding, the MCE5 picks up the "whole truth" of audio broadcast sound because of an unusually wide frequency range (20Hz to 20kHz) and exceptionally fast transient response for any mic, let alone one that is virtually invisible on camera. Because the MCE5 has a uniform omnidirectional pickup pattern, mic placement is not critical and the announcer's head can move without going "off mic." Handling noise is kept to an absolute minimum so the MCE5 picks up the voice, not the rustling sounds of the announcer's expensive silk tie.

The MCE5 is available in various terminations for the widest range of broadcast applications including wireless. Underscoring our longterm commitment to the broadcast industry, the MCE5 is one of a family of reliable Beyer broadcast products designed for ENG, EFP and Film/Radio/Video studio production. It has been widely adopted by discerning broadcast engineers in the U.S. and Europe.

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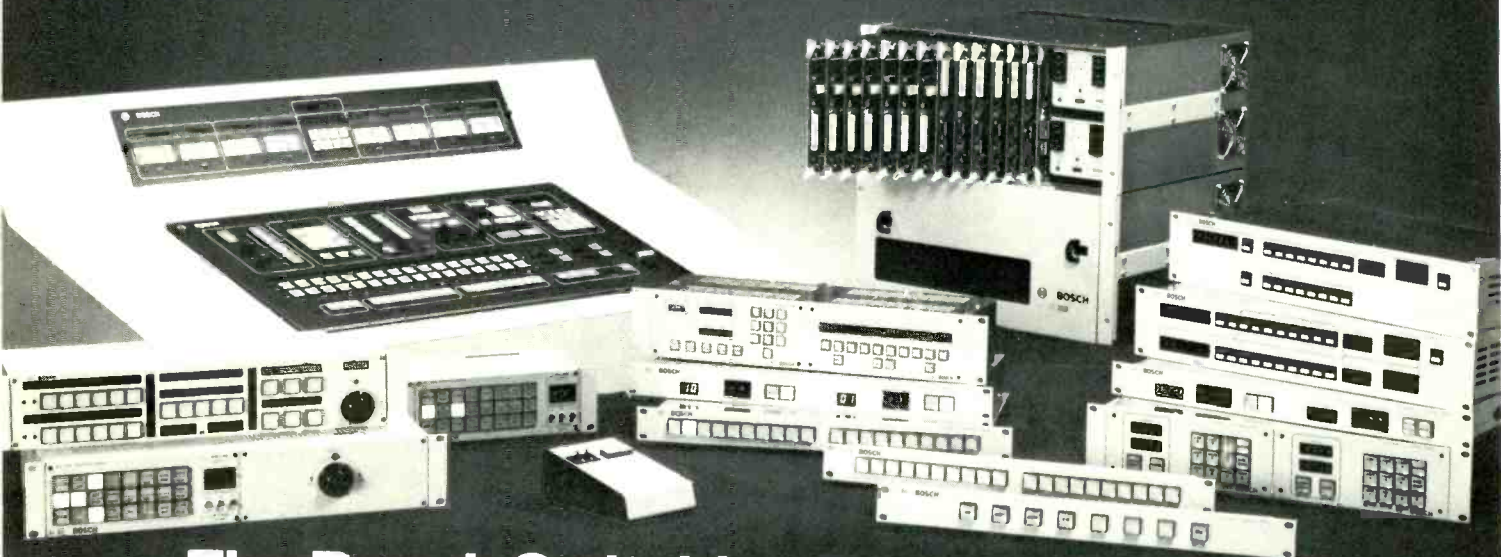


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held belief in the miracle of the marketplace, and the demise of those rules probably did not sadden many Commission officials. Since no help is thus likely to be available from the Commission, some industry efforts are being directed at Congress. One idea is to have the Copyright Act amended to eliminate the local station exclusion. That way (so the reasoning goes) the cable industry and the broadcast industry would be able to negotiate arm's length agreements relative to carriage and compensation, with neither side in the negotiations being subject to any preferred status. As of this writing the prospects for success in that effort are not clear.

Possible appeal

Also available to the Commission and to the broadcast industry is the possibility of an appeal of the court's decision to the Supreme Court. While the Commission may not be inclined to take such an appeal, representatives of the industry have indicated that they will do so. However, the Supreme Court usually chooses not to hear such appeals and, even if it were to agree to consider this one, the chances of reversal are relatively slim.

Finally, the whole matter of individual arm's length carriage negotiations between local broadcasters and local cable operators raises a number of practical, financial questions for the broadcast television industry. Cable carriage has an equalizing effect among competing broadcast signals. That is, the most underpowered independent UHF station, when carried on a cable system, generally provides to the viewer the same technical signal quality as does the local VHF network affiliate. Thus, when the audience has to pick which channel to watch, the primary determining factor would not be signal quality, but the nature of the programming offered. Because of this, in a given market a UHF station with a relatively weak signal could be in a much better position to compete with stations with better facilities if all stations were carried on the local cable system. The must-carry rules assured equal competition and, as a result, assisted in shoring up the prices of stations which might otherwise have been viewed as overpriced.

Period of imbalance

Now that those rules have been eliminated, there is likely to be a period of imbalance leading to adjustments in the valuation of stations, both new and old, as well as adjustments in the valuation of cable carriage. For example, a UHF station with a weak signal would probably not be worth as much if it could not secure cable carriage in a heavily cabled market. By the same reasoning, cable operators will probably be in a position to attach a commensurately higher price tag to carriage of weaker local stations. In assessing the value of any particular business opportunity which might crop up, interested parties should be careful to include consideration of these factors. At this point it is impossible to determine precisely how the elimination of the must-carry rules will alter the extent of opportunity or risk likely to be encountered in the broadcast television industry. Nevertheless, it is apparent that the decision in Quincy Cable cannot be ignored.

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broadcast EQUIPMENT

MTS Recognition Control from Studio Technologies

Studio Technologies has introduced the RCU-1, which is designed for use in conjunction with MTS television broadcast operations.

It determines and displays the mono/stereo status of broadcast audio programming and automatically switches a stereo simulator into the on-air broadcast chain upon recognition of mono.

In order to switch from true to simulated stereo, the unit employs VCA-based cross-fading circuitry.



Extensive circuitry is used to allow ± 45 degrees of phase error (at 1 kHz), and channel level difference of 10 dB to still be recognized correctly.

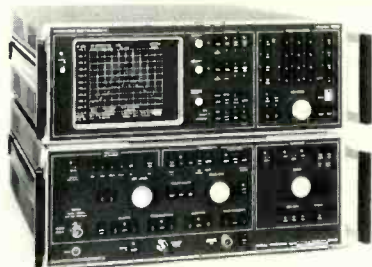
The RCU-1 can also be used as a dedicated mono/stereo recognition device in a television broadcast or production facility. Prior to broadcast, videotapes can be monitored to determine the actual status of the audio channels presented.

Designed as a companion device for Studio Technologies' AN-2 Stereo Simulator, the RCU-1 is also compatible with other manufacturers' stereo simulators. List price for the unit is \$1200.

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Spectrum Analyzer from Marconi

The Model 2382 spectrum analyzer from Marconi comprises two units, the RF unit 2382 and the Display Unit 2380. Its frequency range is 100 Hz to 400 MHz with a resolution of 1 Hz. The analyzer is



keyboard-controlled and fully GPIB-compatible.

The 2382 features 12 digitally corrected filters, ranging from 1 MHz to 3 Hz. Its overall level accuracy is ± 1 dB at any frequency.

A unique feature of the unit is its direct drive to a color monitor. In addition, it provides four separate analog control knobs for level, frequency, span, and marker. Display is accomplished via an electronic graticule that offers a variety of axis labels, including linear and logarithmic scales.

Circle 239 on Reader Service Card

NEC has MTS Transmitters

NEC America's Broadcast Equipment Division has two new multichannel TV VHF and UHF transmitters, the PCN-1400 Series and the PCU-900 Series, which can be used with any presently available stereo generators without any modification.

The PCN-1400 Series feature 10 kW, 20 kW, 25 kW, and 35 kW single output powers, and all-solid-state aural amplifiers. The PCN-1435AH 35 kW model features only



one vacuum tube, with a grounded-grid-type power amplifier.

The PCU-900 Series features models ranging from 10 kW to 60 kW single output powers, with a maximum of 240 kW obtainable by parallel running. The series transmitters have only two tubes, and can be optionally ordered with Amperex, EEV, or NEC klystrons. Users can also choose either vapor or water cooling.

Circle 240 on Reader Service Card

Lenco Introduces Power Amplifier

Lenco has introduced the PPA-100 Stereo Power Amplifier, which delivers 100 W into 8 ohm loads up to 200 kHz.

The left and right input signals are provided by standard chassis-mounted XLR and 1/4-inch stereo phone jacks. An input signal of 0 dB/V will produce 100 W of undistorted power. The number of stages has been kept to a minimum to insure the shortest possible signal propagation delays. In addition, linear input filtering is incorporated to



protect against slewing-induced distortion and transient intermodulation distortion.

A motherboard concept is used to link the power amplifier modules with the rear panel connections. The mounting frame has controlled air flow to prevent overheating under variable environmental conditions. Two fans pull air through the front panel for distribution over the power amplifier and driver stage.

Two green LED bars located in the perforated front panel indicate normal operating conditions. The PPA-100 measures 19 inches wide

"I can describe Ikegami monitors in one word: beautiful!"

— Ed Dooley, Chief Engineer WLWT, Cincinnati, Ohio

Beautiful performance is only one reason why Ikegami's 9 series and 10 series broadcast color monitors and 3H series monochrome monitors continue to capture the attention of more and more video monitor buyers.

It's hardly surprising.

Designed to incorporate the latest advancements in picture technology with precision engineering detail, Ikegami monitors are something to behold.

The features are equally impressive: The 9 series broadcast television monitors utilize In-Line Gun self converging cathode ray tubes with American standard matched phosphors and are available in a 20, 14 and 10 inch model.

The 10 series high resolution broadcast television monitors utilize Delta-Gun tubes to achieve maximum brightness and exceptional convergence and are available in 20 and 14 inch versions.

The 3H series broadcast television monitors feature high quality monochrome displays suitable for sophisticated broadcast studio applications and are available in 14 inch, as well as single and dual 9 inch versions.

Ikegami monitors: Poetry in motion.

For a complete demonstration of Ikegami monitors and cameras, contact us or visit your local Ikegami dealer.

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34" HIGH ENDURA MOBILE TABLE 34" h x 24" w x 18" d. 11 1/4" top to center shelf; 11 1/4" center to lower shelf. 4" anti-shimmy casters, two with brakes. LE-34V . . . \$73

42" HIGH ENDURA MOBILE TABLE 42" h x 24" w x 18" d. 14 1/4" top to center shelf; 16 1/4" center to lower shelf. 4" anti-shimmy casters, two with brakes. LE-42 . . . \$75

42" HIGH ENDURA CABINETIZED MOBILE TABLE 42" h x 24" w x 18" d. One cabinet with locking door. 4" anti-shimmy casters, two with brakes. LE-42-C . \$135

34" HIGH ENDURA CABINETIZED MOBILE TABLE 34" h x 24" w x 18" d. One cabinet with locking door. 4" anti-shimmy casters, two with brakes. LE-34-C . \$132

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SYSTEM 30: Model 30 Fluid Head with one handle, model 55 claw ball metal tripod with spreader . . . \$1875

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Convergence 195 TCRG A/B Roll/Joy Stick Edit Controller with Time Code
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 (2) **SONY VO-5800 U-Matic Recorder/Feeder;** (3) **Panasonic CT-110MA 10" Color Monitors;** **Panasonic TR-930 9" Status Display Monitor;**

Sigma CSG-355A Sync Generator with Bars
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KCS-10BRK . . . \$11.30
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UCA-20s . . . \$12.14
UCA-30 . . . \$14.23
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WV-5203B Triple 5" Black and White Monitor . . . \$555
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by 3.5 inches high and is 14 inches deep. Power response is 10 Hz-100 kHz, -0 dB to -0.5 dB.

Circle 241 on Reader Service Card

Denon Introduces Headroom Extension System

A headroom extension system for the DR-M44 and DR-M33 tape decks has been introduced by Denon.

The Models DR-M44HX and DR-M33HX feature closed-loop tape transport with dual capstan drive, computer servo control, and an SF combination head. They can help eliminate problems such as dynamic frequency response errors lacking in high-frequency energy, lowered saturation level, and increased IM distortion.

The DR-M44HX and DR-M33HX also monitor the total amount of the effective bias fed into the recording head, and they respond to any peaks or dips in the audio signal in order to maintain an optimum bias for the signals being recorded. In addition, they will automatically adjust the bias level to suit the frequency being recorded at any given moment.

In order to increase tonal quality, the units also employ LC-OFC (Linear crystal, Oxygen-free copper) wire in the head's lead line.

Circle 242 on Reader Service Card

ART Digital Reverb Units

The Model 191, Model DR2, and Model 1500 digital reverb units are now available from ART (Applied Research and Technology).

The Model 191 allows the user to use seven preset programs. All reverb settings can be stored for later recall in seven nonvolatile user



presets. The 191's software allows control of reverberation parameters from the front panel. It provides nine room types. One through five are normal rooms, six and seven are dynamic rooms, and eight and nine are F.I.R. (Finite Impulse Response) rooms.

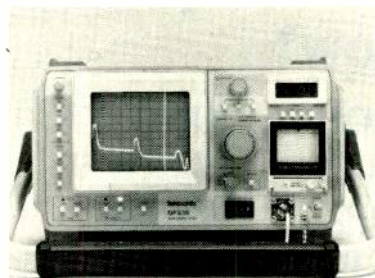
The DR2 is a digital signal processor with microcomputer control. It provides three room types—plate, room, and hall—with all necessary control parameters.

The Model 1500 Digital Delay has a 20 kHz bandwidth, with 0.15 ms to 1500 ms delay in four ranges. Also included is 10:1 sweep ratio, front and rear infinite repeat, 90 dB dynamic range, and 0.2 percent maximum distortion. Other features include switchable instrument or line levels, buffered high-impedance input, and buffered low-impedance output.

Circle 243 on Reader Service Card

Fiberoptic TDR from Tektronix

Tektronix has made available the OF235 switchable 1300/1500nm dual wavelength fiberoptic time domain reflectometer, which is capable of making quantitative,



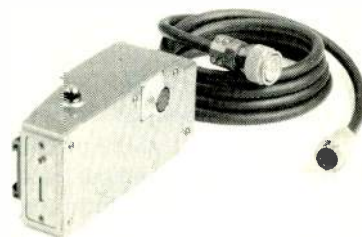
calibrated loss, and distance measurements on single-mode fiber at either the 1300 or 1550nm wavelength.

No plug-ins are necessary for the OF235, which is microprocessor-controlled and has a full-screen display. Features include automatic splice loss, automatic dB/Km loss, GPIB, one-meter resolution, and optional extended function module.

The OF235 operates on 12 V dc, and is available for an introductory price of \$29,500.

Circle 244 on Reader Service Card

Ikegami Beta Recorder Adapter



Ikegami has introduced the VBA-1, a new Beta recorder adapter for use with the Ikegami HL-79E ENG/EFP camera. The VBA-1 enables Beta format recorders to be used for the first time with an Ikegami camera.

The unit consists of an adapter that attaches directly to the recorder and a special cable to the VTR connector on the camera.

Ikegami will soon have available other adapters of use with their ITC-730A and ITC-730AP broadcast cameras.

Circle 245 on Reader Service Card

Countryman has New Microphones

Countryman has introduced a new line of microphones that feature a variety of polar patterns. The ISOMAX II precision electret microphones are available in omnidirectional, cardioid, hypercardioid, bidirectional, or omnidirectional with calibrated frequency response polar patterns. Their sensitivity is -57 dB, and output impedance is 600 ohms \pm two percent balanced. Battery life is 100 hours, with a red LED that flashes continuously during the last 10 hours of battery life. Dimensions are 8 mm by 4 mm, excluding cable strain bushing.

Also new is the ISOMAX TVH Hypercardioid Lavalier Microphone, which features room noise and reverberation reduction from 6 dB to 15 dB. It eliminates phase cancellation from multiple mics, and has active vibration isolation for low handling noise. A built-in high pass filter cuts wind noise and rumble. The TVH has a frequency response of 70 Hz to 18 kHz, and its sensitivity is 52 dB. Its battery power mod-

Circle 246 on Reader Service Card

ule requires two Eveready #522 or Mallory NM-16094 9 V batteries, which will power the unit for 500 hours of operation.

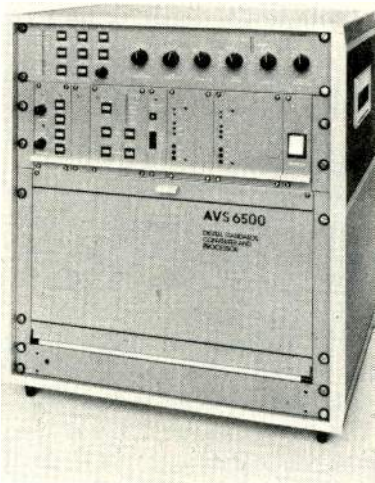
Two other new microphone series are the Countryman ISOMAX III and the ISOMAX IV. The ISOMAX III flexible extension tube mics feature a frequency response of Omni 20 Hz to 20 kHz, and output impedance of 600 ohms balanced, transformerless.

The ISOMAX IV are also flexible extension tube mics, but designed for high quality voice applications. They feature a hypercardioid polar pattern, with a frequency response of 70 Hz to 18 kHz.

Circle 247 on Reader Service Card

Standards Converter from AVS

AVS, a subsidiary of Avesco Ltd., now has the AVS 6500, a television standards converter and signal processor.



The 6500 incorporates genlock, SECAM input, RGB output, and multigrab facilities. Its signal processing features include chroma retiming, noise reduction, and freeze-frame.

The 6500 can be used by video facility houses, and can be leased, purchased, or rented through the Hi Tech Rental division of Avesco.

Circle 248 on Reader Service Card

EEV Features High-Power Klystron

The K3672BCD high-power klystron from EEV is designed for UHF television broadcast applications and gives a peak sync power output of 64 kW. It can operate in the frequency range from 470-810 MHz.

The K3672BCD features an improved cavity design. Continuously variable tuning over the tube's wide frequency band is also provided. An electron gun incorporating a beam control device (BCD) gives greatly enhanced efficiency to the K3672-BCD, and enabled operation under pulsed conditions. In addition, beam current can be reduced between sync pulses without loss of picture quality.

Circle 249 on Reader Service Card

New Modem from International Microwave

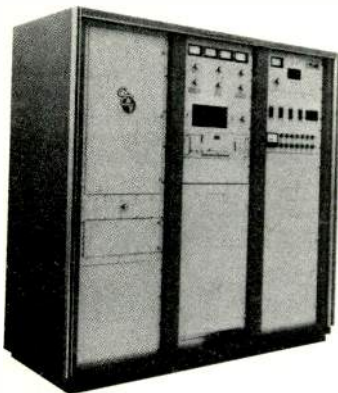
The T 1 modem from International Microwave operates at a subcarrier frequency of 6 MHz above video and allows simultaneous data/voice and video communications on one link.

The use of a linear FM microwave radio assures minimal crosstalk between video. The T 1 achieves a fade margin by increasing the receive level to -25 dB. It contains a built-in power supply with alarm, circuitries to indicate loss of data or subcarrier, and can accommodate a path up to 30 miles.

Features include 24 (56 kilobit) channels, data interconnect for local area networks at T 1 rates, and an option for two T 1 data streams—one on baseband, and one on subcarrier.

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*Partial list

low power consumption make it a great investment. Combine with duplicate 816R-4 to get 55 kW output. For brochure, call (214) 381-7161 Continental Electronics Division, Varian Associates, Inc., PO Box 270879, Dallas, Texas 75227.



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Circle 207 on Reader Service Card

Soundcraft has New Console

The 200B Series portable mixing console from Soundcraft includes improvements to routing, with the

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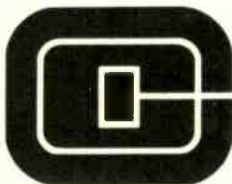
Your requirements are unique to your organization, and that's how your operating system should be.

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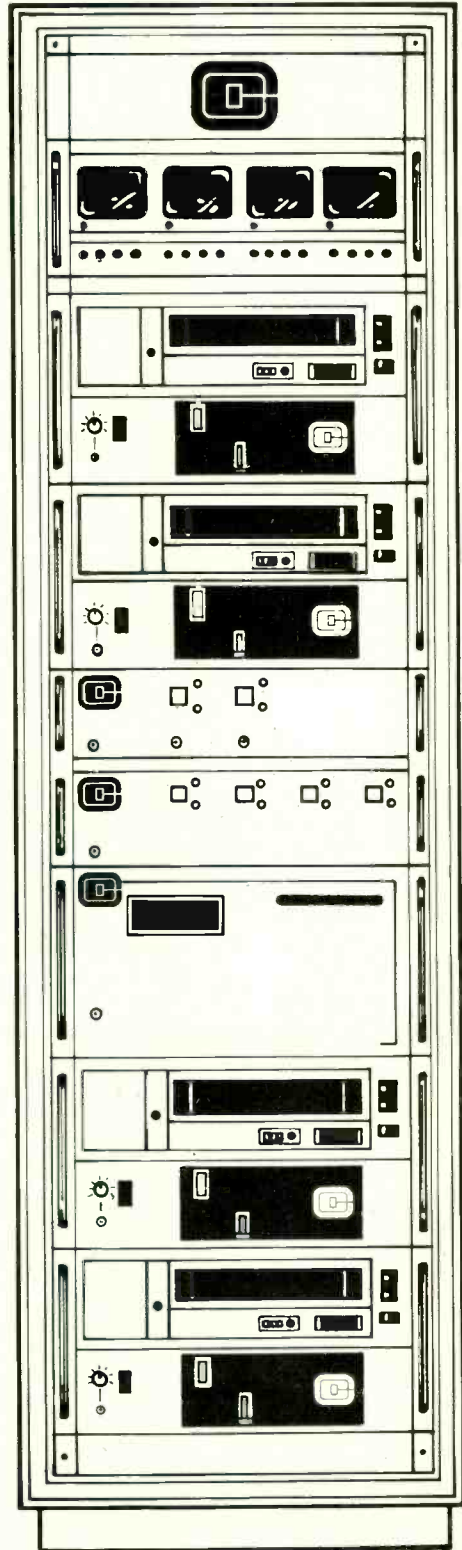
CCI custom-builds the system to your specifications in our own plant. If you later change your mind about the way your system should operate, no problem. Our CMOS circuitry is driven by EPROMs, so just tell us what you want done differently, and we'll blast a new EPROM. Presto, the change is made.

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facility to route to four groups, and a more comprehensive master module that features "Talk-Back," a built-in microphone and oscillator.

In addition, monitoring is now available on both headphones and speaker outputs. Eight-, 16-, and 24-channel versions are now avail-

able, as is an eight-channel rack-mount model.

Circle 251 on Reader Service Card

Gotham Audio has Equalizer System

Gotham Audio has introduced the Neumann AME 591, a fully automated analog equalizer system for multichannel recording.

The 591 provides up to 64 studio channels utilizing digital control for all equalizer parameters. Microcassette data storage allows 10 banks of equalizer settings to be recalled instantaneously from RAM during mixdown.

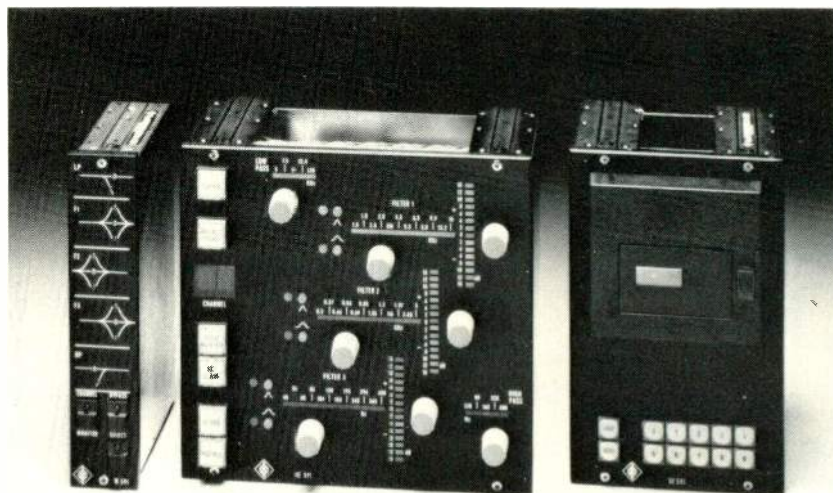
The unit's operating panel provides a central control center for individual channel equalizers, each with LED indication of the basic settings. Settings include: three parametric filters with ± 15 dB range in 2 dB steps; tuneable filter frequencies of 45-450 Hz, 300 Hz-3 kHz, and 1.5-15 kHz; selectable band-

width of 1 or 3 octaves; high-pass filter with four selectable frequencies and 12 dB per octave attenuation; and low-pass filter with four

selectable frequencies each and 12 dB per octave attenuation.

The system is available in a rack-mountable version, or it may be integrated into existing multichannel consoles. An eight-channel system is priced at \$14,850.

Circle 252 on Reader Service Card



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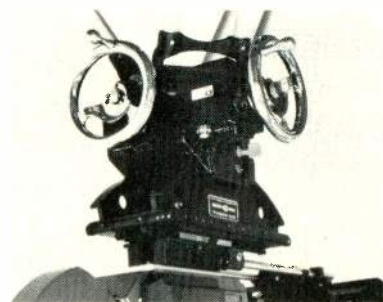
7201 Lee Highway, Falls Church, Va. 22046 (703) 532-0700

Circle 209 on Reader Service Card

Pan Cable Head from Cinema Products

A new continuous pan version of the Mini-Worrall cable drive geared head is now available from Cinema Products.

The Mini-Worrall is the only gear-type head featuring cable drive in both pan and tilt and an integral tilt plate. It now features endless pan capability, as well as two improved positive lockdown systems. Both pan and tilt handwheels are outfitted



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Thousands of CATV, SMATV, and broadcast operators everywhere have placed their trust in DRAKE's professional equipment — and for good reason. Our name has been synonymous with excellence and reliability in the communications field for many, many years.

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The DRAKE VM2410 Modulator

With the Drake VM2410 a single modulator provides 60 channel frequency agility. A simple push of a button will set the VM2410 output to any VHF Broadcast, Mid-Band, Super-Band and Ultra-Band channel up to 400 MHz. The VM2410 also features video low pass and IF SAW filtering for reliable operation in the most crowded systems. A full 57 dBmV output ensures maximum performance.

The DRAKE ESR2240 Earth Station Receiver

A true step ahead in design technology. Some of the ESR2240's outstanding features include fully synthesized transponder and subcarrier selection, block down conversion with our BDC-24 Block Converter or LNB, IF loop-through for easy multiple receiver installation, SAW filtering for maximum interference rejection and adjacent channel performance, full signal metering on front panel — and much more.

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Circle 210 on Reader Service Card

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with easy access detente lock levers to activate the system's sure control drag brakes. A new positive pan drum lock assures dependable tiedown.

A second version of the Continuous Pan Head, the Mini-Worrall Super, is also being offered. This model's tilt plate incorporates a Sachtler-style quick release system.

The Mini-Worrall Continuous Pan is priced at \$13,000, while the Super version costs \$14,000.

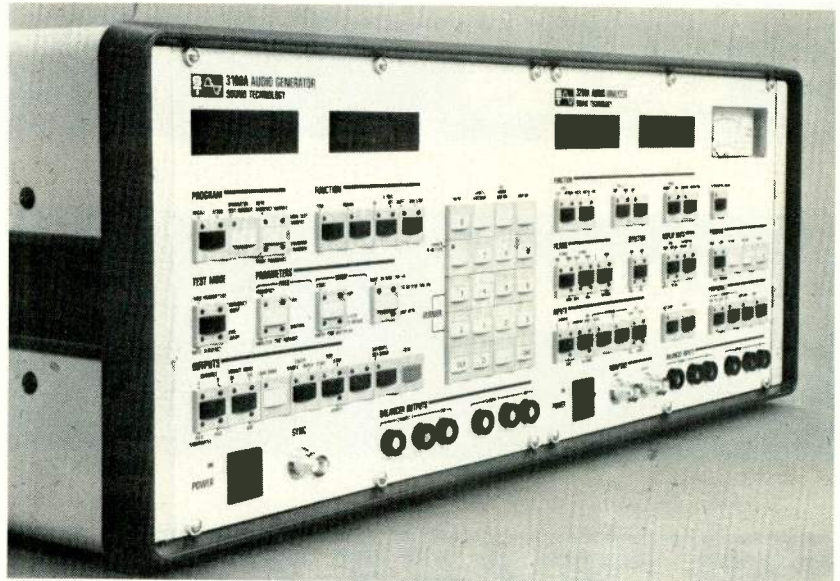
Circle 253 on Reader Service Card

Sound Technology's Audio Test System

The 3000 Series (3100A generator and 3200A analyzer) audio test system from Sound Technology performs remote testing without external controllers, terminals, or telephone lines.

By using Frequency Shift Keying techniques, the 3000 Series allows the generator to communicate with the analyzer. This communication is performed by transmitting specified signals similar to the European Broadcast Union (EBU) recommended code sequences. The generator can be located at the user's studio and the analyzer at an unmanned remote transmitter site.

The front panel programmability



of the 3000 Series allows the storage in nonvolatile memory of complete

audio test sequences. The user can enter a two-digit entry and have a complete audio test performed over a distant audio path in a matter of seconds. Test results are stored in the analyzer, or printed out on a standard printer.

The 3000 Series also features Notch Lock, which allows the user to make signal-to-noise measurements in the presence of a low-level signal, as in the case of digital studio systems or digital telephone systems.

Both the 3100A and the 3200A can be accessed via standard RS-232C or GPIB interfaces. One controller can run up to 15 of the 3000 Series instruments.

Circle 255 on Reader Service Card

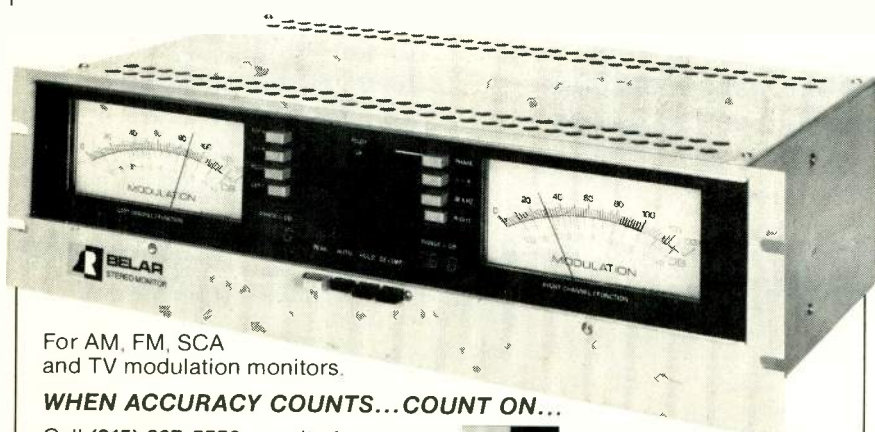
Audio Distribution Amp from Dyma

Dyma Engineering has announced the availability of its Model 815 audio distribution amplifier in stereo configuration. The 815 addresses the increased need for stereo distribution amplifiers, particularly with the advent of stereo television.

The Model 815S is packaged in the same configuration as the mon-

aural versions featuring individual power supplies for each amplifier and wiring seizing connection for inputs and outputs. The 815S has one stereo input and four stereo outputs with a common stereo gain control.

Circle 254 on Reader Service Card



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Circle 211 on Reader Service Card

Crosspoint Latch Switcher

A new, fully-programmable post-production switcher from Crosspoint Latch Corp. is available, offering powerful storage capabilities.

The 6109/7209 combination features 400 programmable event registers. Each register consists of the

Nurad's new 13 GHz compact transmit system...

a small wonder.

The Model 130R1M compact antenna is offset fed for low sidelobes, multi-polarized, and it features a detachable reflector and quick-disconnect waveguide and antenna mounts.



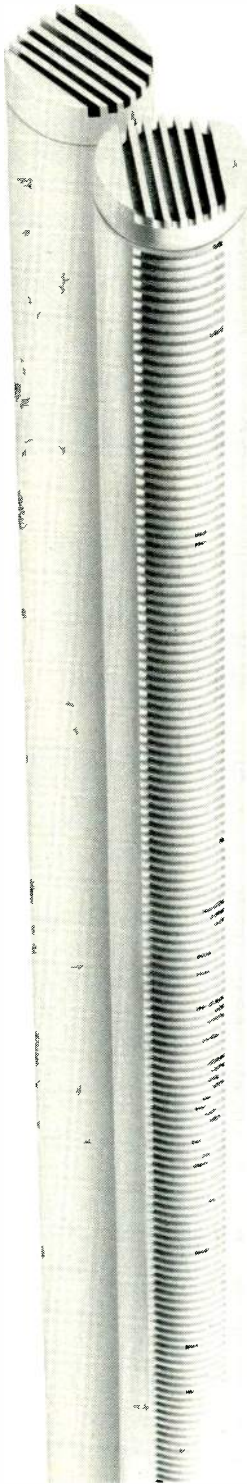
The Model 130CT1 compact transmitter features synthesized 22 channel operation, 100 milliwatt output, and 2 audio subcarriers.

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switcher's control panel configuration and is grouped with up to three additional event registers to complete the "Four-Event Sequence." There is a "concise" events option, allowing up to 100 additional four-event sequences for a total of 400 event registers in all. The sequences can be randomly recalled, performing the particular event register or running a sequence as previously programmed.

The switcher has editor interface options for full external control, but a special TRIGGER mode allows an operator to program a sequence of moves or partial wipes that can't be initiated from an editor. The switcher has eight inputs, three buses, and features a full complement of features such as 32 wipe patterns, pattern modulation, bordered and soft wipe edges, auto transitions, preset wipes, spotlight, chromakey, and internal and external keys.

Circle 256 on Reader Service Card

Ampex Unveils Digital Video Processor

A new fully digital video processor from Ampex is set for introduction at the SMPTE show. It integrates newly developed time base correction technologies with advanced video processing and variable motion capabilities. Designed to eliminate "hopping" or "blurring," the Zeus I is a fully digital



system compatible with all Ampex Type-C VTRs.

Features include slow motion and program compression, bad color frame edit processing, full frame store capability, enhanced dropout replacement and full digital controls. The Zeus I is available in NTSC, PAL-M and front panel switchable PAL/SECAM formats,

and is slated for delivery in the fourth quarter of this year.

Circle 257 on Reader Service Card

Kahn AM Stereo Signal Generator

Kahn Communications has announced manufacture of AM stereo signal generators for testing multisystem receivers operating in the Kahn/Hazeltine AM stereo mode. The signal produced approximates that of the latest Kahn AM stereo exciter and meets FCC requirements for that system. Kahn Communications developed the generator in cooperation with Boonton Electronics in anticipation of large-scale production of multisystem AM stereo receivers, and makes use of the Boonton FM-AM signal generator Model 103D, modified for low-distortion phase modulation. A programmable version of the generator will also be available.

Circle 258 on Reader Service Card

New ArtStar Software

ColorGraphics Systems has introduced vector font software for its ArtStar II computer paint system. The type can be colored, have drop shadows or add three dimensions, and generate backgrounds or be pasted over art or a digitized image. One font can be manipulated to any point size from six to 128 points and each letter, word, phrase or sentence can be italicized to any angle. The package comes standard with five fonts and necessary software. The software program emulates the old vector terminal technology by plotting each critical point in a character using vector algorithms. A library of over 400 fonts from which to choose additional type is also available.

Circle 259 on Reader Service Card

Crown Introduces New Phantom Power

Crown has a new single-channel, transformer-isolated, phantom power

er supply that operates on two nine volt batteries. The PH-1 supplies simplex phantom powering for Crown PZM or PCC Series microphones and will also power other condenser mics that operate on 18 V or less, simple powering.

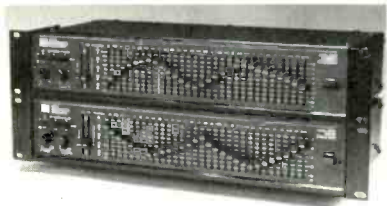
Supply voltage is +18 V dc on pins 2 and 3 with respect to pin 1 of the input connector. The PH-1 has a high-quality 1:1 isolation transformer and can be easily balanced. Suggested price is \$49.95.

Circle 260 on Reader Service Card

New JBL Equalizers

JBL has two new equalizers designed to improve headroom and provide lower noise. Both make use of a new solid-state hybrid to synthesize the inductor in the LC circuit.

The 5547 active graphic equalizer has 30 1/3 octave bands centered between 25 Hz and 20 kHz, with 12 dB



boost or cut available at center frequency. The 5549 room equalizer provides corrective equalization and a 0-15 dB cut-only range. Both have front panel input and output level controls and LED display, and both incorporate high- and low-frequency end-cut filters.

Circle 261 on Reader Service Card

New RGB Video Test Pattern Generator from Vii

Vii's Signal Source 44 RGB Color Video Test Pattern Generator, packaged in a portable cabinet, allows the conducting of incoming inspections and the setup of RGB monitors. It provides all patterns necessary for accurate display evaluation, and its test pattern selection includes Color Bars, Flat Field, Bars, and Dots by front panel switch. The output signal can be selected for various applications.

Circle 262 on Reader Service Card

Finally, day-long comfort and...

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clear, two-way communications between camera and director.

This headset series is specifically designed to provide high quality communication through camera intercoms in television studios or remote locations. Telex camera headsets have sensitive carbon microphones with a smooth voice frequency range of 300 to 4500 Hz. They offer compatibility with Western Electric type intercom circuits and are available with or without push-to-talk switch for compatibility with most existing systems. The earphones contain high sensitivity magnetic receivers that can be easily removed and replaced in the field for convenience and economy.

Designed for comfort

All units are designed for long lasting durability and lightweight comfort that lasts throughout a long camera session. The headband and earphones have removable, soft foam filled pads covered in supple polyurethane that resists cracking even after years of constant use under hot studio lights or sunlight. The mike is housed on a boom that rotates on a swivel ball for full flexibility in positioning the mike to the mouth, while giving the user the option of wearing the headset with the mike on the right or left side of the head. Washable nylon earphone socks provide further comfort.



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BUSINESS BRIEFS



In Hollywood, CA The Post Group's new sound department, Suite A, features a Neve 8128 48-track stereo mixing console with Necam 96. At left is a machine room, and voice/announce booths are on either side of the video projection screen.

National Public Radio's Distribution Division recently reached an agreement with Wold Communications to offer a 15 kHz, full fidelity **sports backhaul service via satellite**. This service will enable NBC Radio to offer radio broadcasts of college and pro football games throughout the 1985 season, including the Orange Bowl and the Super Bowl.

Studer Revox has announced a 40 percent increase in sales of its A800 multitrack recorder, and a 38 percent increase in sales of the A80VU multitrack recorder New York City-based **A/T Scharff Rentals** has taken delivery of a brand-new Sony PCM 701 ADR two-track recorder ABC affiliate **KCEN-TV**, Waco/Temple TX, recently purchased equipment from Panasonic including

an MVP-100 multifunction video player, six AU-300B Studio VCRs, six AK-30 handheld cameras, and three AU-S220 portable M-format VCRs In Farmington Hills, MI, **Grace & Wild Studios** has purchased a Thomson-CSF Vidifont Graphics V character generator/animation system.

Texas-based **Dalsat, Inc.** and San Diego's **Centro Corporation** have inked an agreement to strengthen each company's marketing goals and provide greater product quality and capabilities **Circuit Research Labs** has purchased inventory, patents, licenses, contract rights and the business name of Dallas-based MicMix Audio.

Larcan Communications has opened a new sales office at 6335 West Joliet Road, Suite 202, Countryside, IL

. . . . **The Droid Works** recently announced the opening of a new eastern regional sales office at 645 Madison Avenue, New York, NY 10022

The Camera Mart has added two regional offices, one at 825 Royal Avenue in Evansville, IN, and the other at 16783 Beach Boulevard, Huntington Beach, CA In Westchester, NY, **Cubicomp** has opened a regional sales office. In a related item, Breneman Labs of Columbus, OH, is a new consulting firm specializing in installation, training, and custom software and support services for the Cubicomp 3D graphics system.

MixMasters has completed installation of a Neotek 3C Series recording console with 36 inputs and 32 outputs

A second ADO channel and a second Quantel Paint Box have been installed at **Varitel Video's** one-inch teleproduction system **VCA**

Teletronics has provided production and post-production work for ATI Video Enterprises' weekly music/entertainment series, *TV 2000* New York City's **LRP Video** recently edited *Purely Gershwin*, a 90-minute retrospective of the composer's work

In California, Paramount Studios has contracted **CCR Video** to provide a mobile unit to *Family Ties* for 24 episodes and another unit to *Webster* for 23 episodes. CCR will also provide Warner Brothers Studios with one truck for 22 episodes of *Night Court* and 12 episodes of *Growing Pains*.

Among the personnel changes this month, editor Ken Gutstein has joined **TVC Video** in New York At

Lexicon, Lawrence J. Rich has been appointed broadcast sales manager for North America Roger Stevenson is the new VP of engineering and sales at **Marvin H. Sugarman Productions**

Ampex has promoted Donald Bogue to vice president.

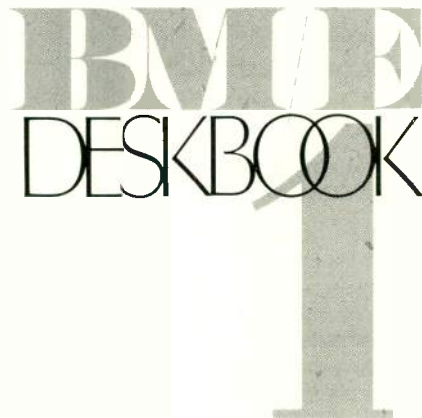
At **Fuji**, Bob Kuczuk and Joe Visslailli have been appointed national and regional sales managers respectively Michael Feniello has been named national product manager for

Sony's Professional Audio Division **ADDA Corp.** has appointed Jon

Teschner national marketing manager, ESP/VIP systems.

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