

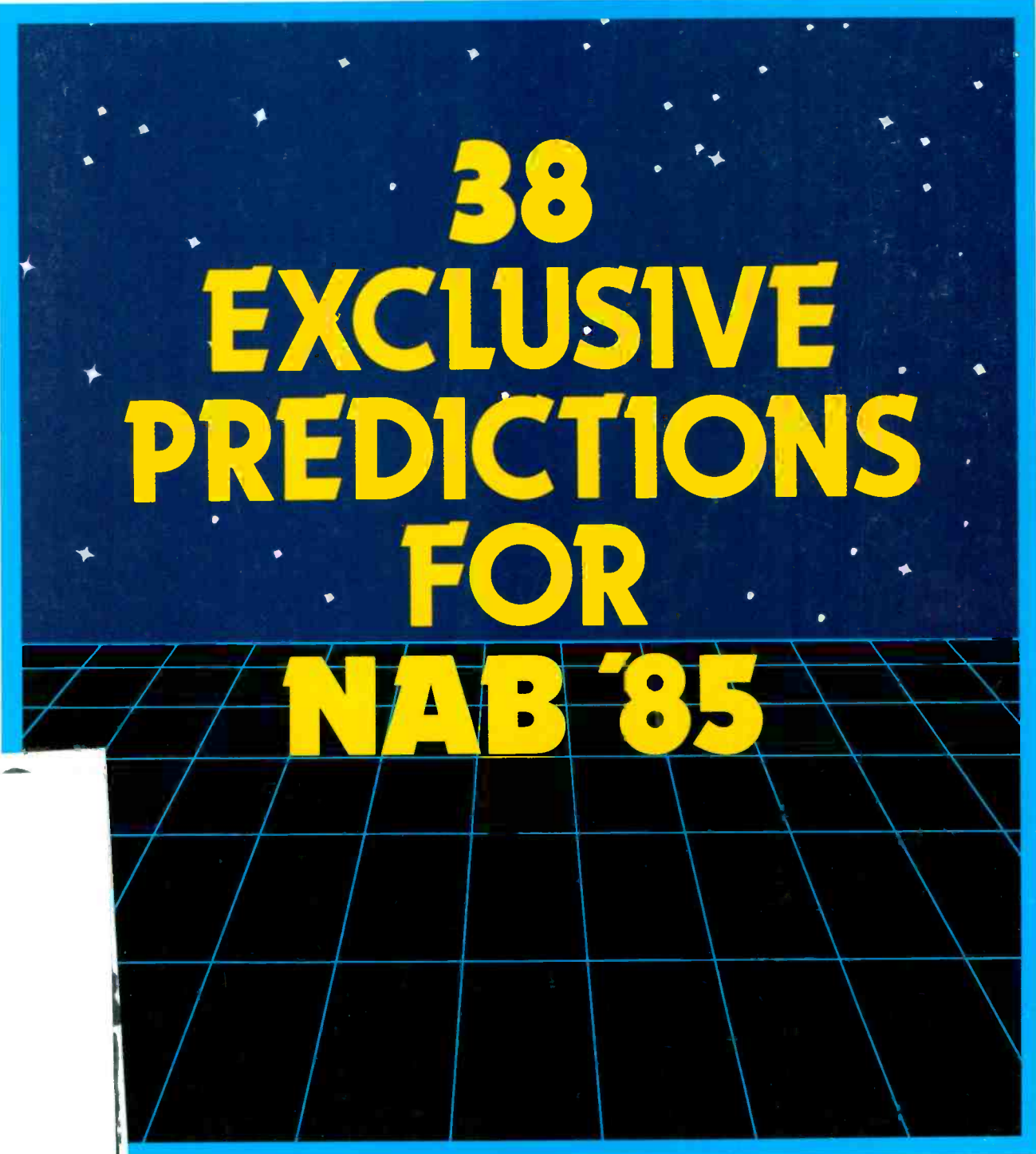
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Programming &
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Papal Visit
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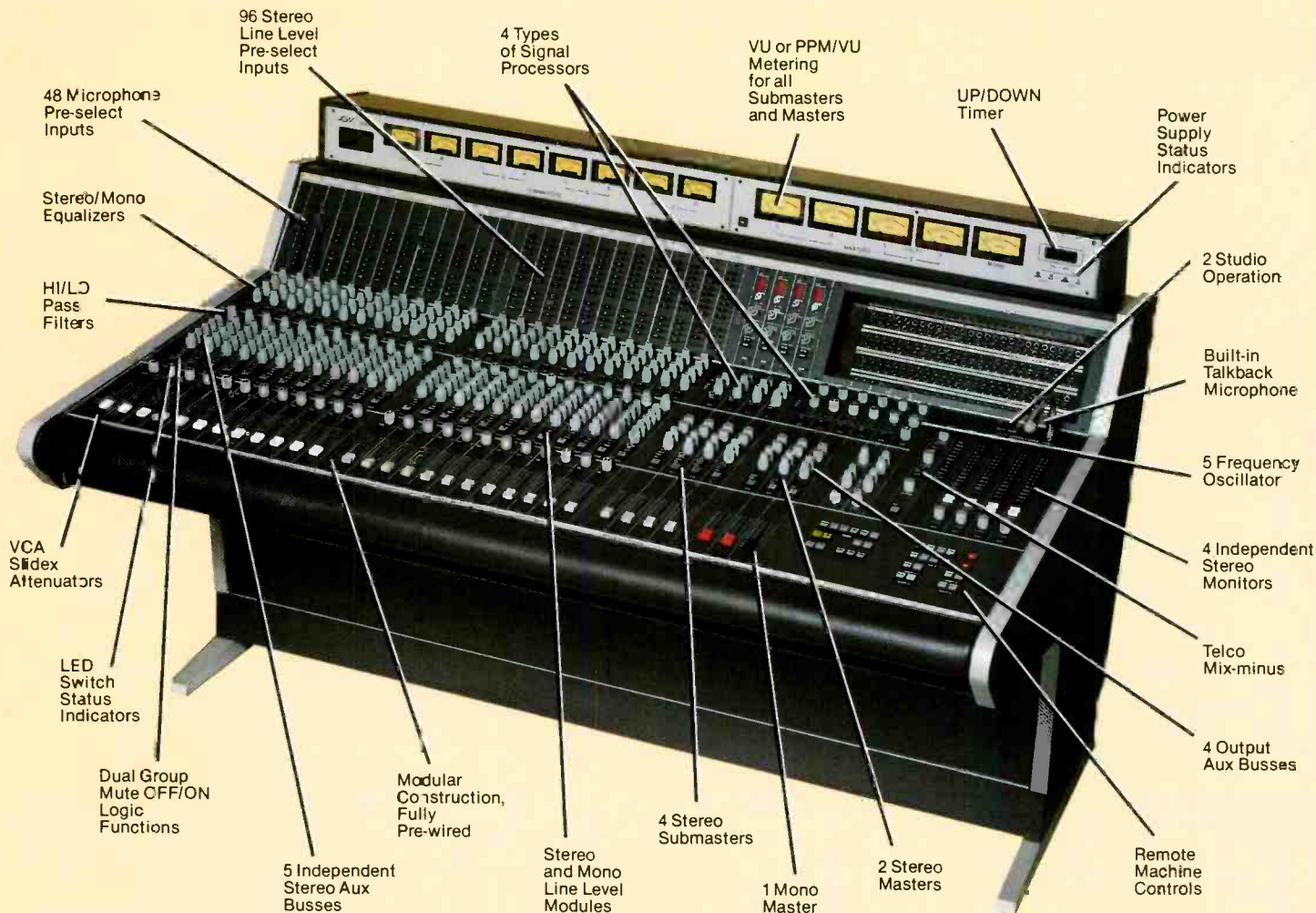


38
EXCLUSIVE
PREDICTIONS
FOR
NAB '85

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INTRODUCING THE SONY BVP-360. ON MAY 1, 1985, THE REMARKABLE BECOMES AVAILABLE.

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

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

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



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

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

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

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

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

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

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

A SUPERHUMAN FEAT OF HUMAN ENGINEERING.

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

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

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

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

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

NOT JUST A CAMERA. A CAMERA SYSTEM.

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

It starts with a



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

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

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

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

ADOPT A WAIT-AND-SEE ATTITUDE.

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

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

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Broadcast

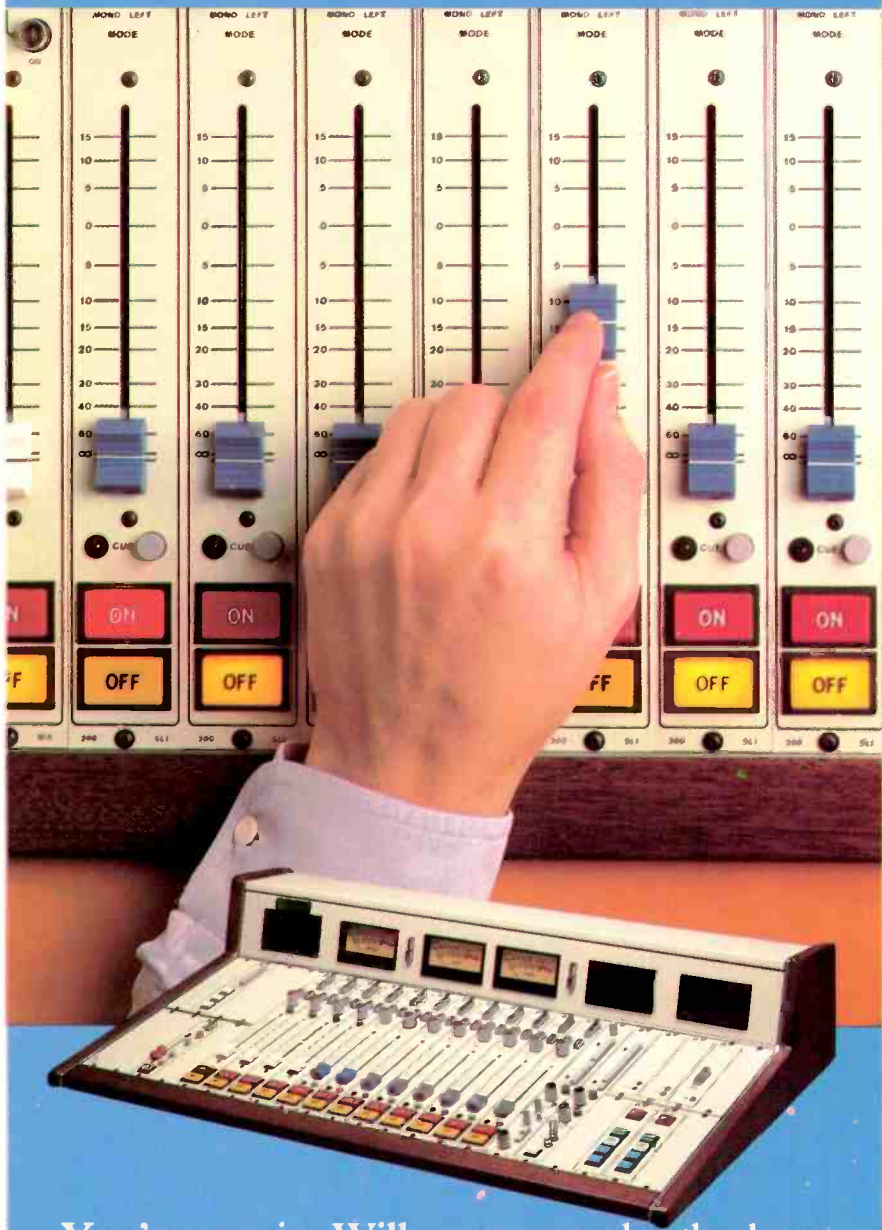


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Customer Orientation

No. 2 in a Series

Subject: The Convergence Principle

204

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BROADCAST MANAGEMENT/ENGINEERING

FEBRUARY 1985

VOLUME 21/NUMBER 2

FEATURES

38 EXCLUSIVE PREDICTIONS FOR NAB '85

BM/E predicts some of what may be in store for NAB '85 ... Staff Report

STUDIO CAMERAS: FOCUS ON THE FUTURE

It seems that the studio camera has reached its outer limits. But have manufacturers gone as far as they can go? ... *by Eva J. Blinder, Senior Editor*

OPTIMIZING PROFITABILITY WITH INFORMATION MANAGEMENT

A management information system can compile information that can be used to improve your operation ... *by Bryan D. Boyle, Contributing Editor*

MONITORING TECHNOLOGY AIDS REMOTE CONTROL

Thanks to new automated monitoring techniques, large remotely controlled networks can proceed with safety ... *by Larry Evans*

NEW PRISM STRETCHES CAMERA CAPABILITIES

The versatility of 2/3-inch format cameras has been limited by their relatively poor sensitivity and great depth of field. With the development of a new f/1.2 prism, there is a solution ... *by Robert Rivlin, Editor*

INDUSTRY NEEDS: A DECADE OF TRANSITION

BM/E's annual Survey of Broadcast Industry Needs shows many changes ... Staff Report

SMPTE CONFERENCE EYES COMPONENT TECHNOLOGY

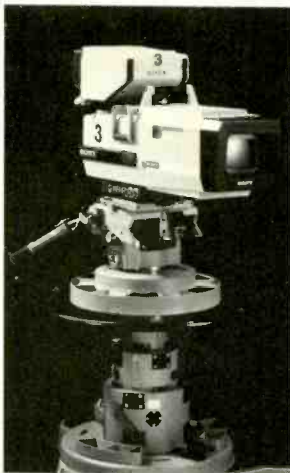
The theme of the annual SMPTE television conference will be components ... *Staff Report*

FACILITIES DESIGN AND ENGINEERING: PART 15 SELECTING AN INTERCOM SYSTEM

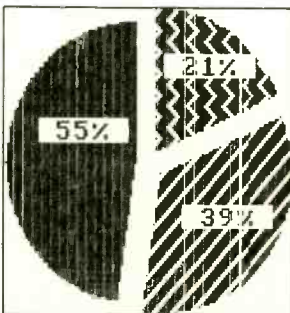
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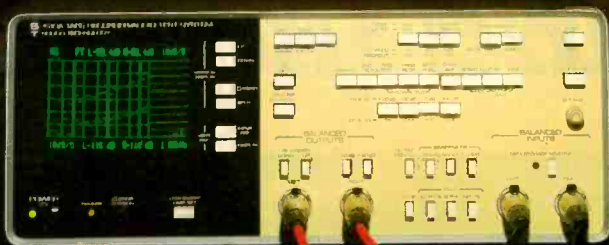
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■ NAB SHOW ISSUE

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Challenge For Programming

Television programming, like innovation itself, is risky business. Without it, there would be a very dull future on the treadmill of game shows, sitcoms, and soaps that inspire as few viewers as they offend; but it also carries the possibility of failure.

Whereas equipment manufacturers face industry pressure to innovate and improve their products, television program directors face another kind of pressure, that of advertisers unwilling to bet on an unproven product. This can be especially acute for independents, who face often arbitrary prejudice against them from ad agencies mistrustful of nonaffiliates.

Last month's INTV convention, which drew 1200 participants, heard a challenge from Norman Lear, who has made his name—and fortune—by taking programming risks. Contrasting the rising competitive strength of the independents with the weakening shares of the networks, Lear asked if independents would let their success lead to what he called “a sclerosis of the spirit.” He challenged, “Will you, in an obsessive need to win in the short term, refuse to take risks, to challenge, to change?”

That “need to win in the short term,” however, stems from the very structure of commercial television. Dependent on ad sales tied to their rating books, it is no wonder that independent television stations often opt for the least-common-denominator approach to programming. But innovation has not been entirely absent from independent TV, as witnessed by the success of such “unsaleable” shows as *Mary Hartman, Mary Hartman* and *Fame*—network rejects that indies turned into gold mines. Creative local production, while unknown at many stations, is a success at many more.

Lear warned his INTV audience that independent stations must innovate and dare if they are to succeed. “The most important factor, the only factor in the competition for viewers, will always be the program, the software itself,” Lear asserted. “. . . The demand will be for programming that is different, innovative. . . . But it needs TV programmers who are willing to allow the creative spirit to soar.”

Will independent broadcasters rise to Lear's challenge? True, it's a risky proposition. But independent television's rising influence brings increased responsibility to serve its audience, who, after all, are people, not numbers in a ratings book.

You'll Sound Better ON THE AIR

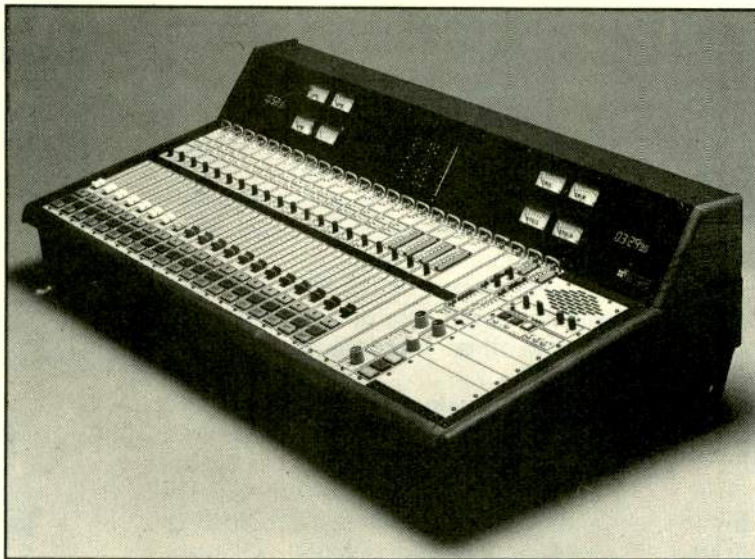
Introducing the new Harrison AIR-7

AIR-7 is better. Simply because no other console combines better sound with reliability and value. The AIR-7 features recording studio quality electronics—the same kind of quality that goes into Harrison recording, television, and film post-production consoles.

We know you need a console you can rely on. One that delivers better sound, is consistent and *affordable* too. That's why Harrison has developed the AIR-7 broadcast console. Harrison's trademark of built-in reli-

ability insures long-term performance. The AIR-7 design includes unique audition switch logic, the key to easy, error-free operation.

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



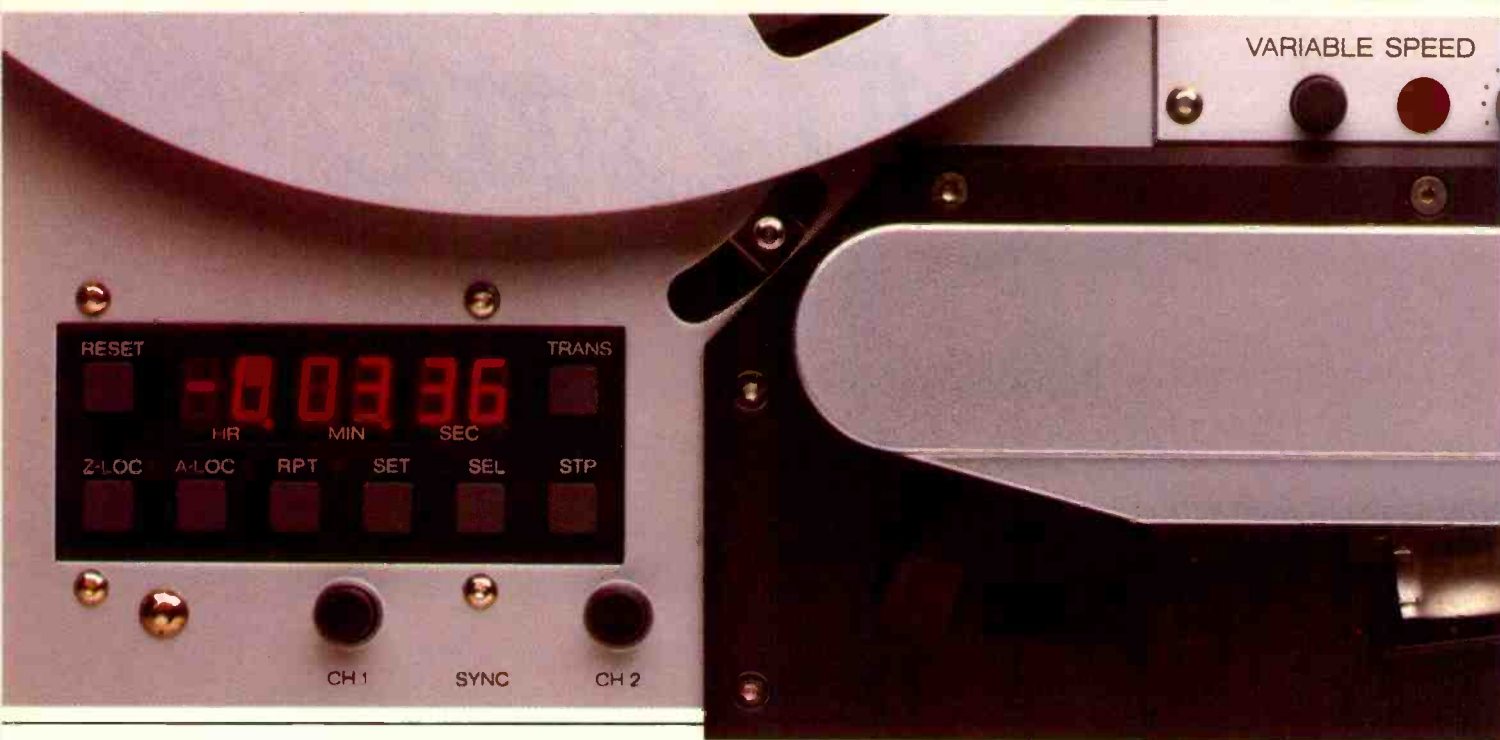
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vates play mode for a continuously repeating cycle.

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STUDER REVOX



PR99 MKII with optional carrying case and monitor panel. Roll-around console also available.

Hitachi Demos Prototype HDTV Camera, DVTR

At a recent exhibition of its latest technology developments, Hitachi introduced to the broadcast industry a high-definition television system comprised of not only a camera and rear-projection screen, but also what the company called the world's first digital VTR for HDTV.

Based on the Type-C analog VTR, the digital HDTV deck uses conventional one-inch tape and video heads. The recorder's five-channel recording

system incorporates five heads, each recording at 92 Mbit/s for a total bit rate of 460 Mbit/s. Error correction techniques counteract noise in the system, resulting in S/N of around 56 dB. Like the camera and display unit, it is designed around the 1125-line NHK HDTV standard.

Hitachi's HDTV camera uses three one-inch diode gun Saticon pickup tubes, developed for high-definition television with the cooperation of

NHK. The camera's digital registration system divides the raster into a 19 by 19 grid and corrects each area independently, resulting in an error rate less than 0.025 percent. In addition, a microcomputer within the camera compensates for registration errors caused by chromatic aberrations in the lenses. (This system was developed jointly with Canon Inc., which also built the special HDTV lens used with the camera.) The camera also has an image enhancer and a special circuit to compensate for shading errors.

The third system component, the rear-projection display, is a 54-inch screen with high contrast ratio and almost twice the brightness of other HDTV projectors, according to Hitachi. The increased brightness comes from three specially developed nine-inch projection tubes with high-efficiency light-emitting phosphors and magnetic focusing electron guns.

While declining to name firm availability dates and prices for the HDTV system, Hitachi was willing to propose some ballpark figures. The DVTR probably will be available "as a special product" in one and a half to two years at a price "hopefully" under \$400,000.

Both the camera and the display should be available in about a year, with the camera costing \$250,000 or less and the display \$40,000 or less.



Dr. Yoshizumi Eto, senior researcher at Hitachi Central Research (left) and Hishashi Nakamura, department manager, HDTV systems department, show off new one-inch HDTV digital VTR.

AM Post-Sunset Power Changes Activated

As a result of recent FCC action, most Class II and III radio stations have received permission to go ahead with the power increases they have been waiting for. All Class III stations can now broadcast with at least 50 W during the pre-6:00 p.m. period, and many have "substantially more," the FCC says.

The compromise between the classes was put together by the Association of Broadcast Engineering Standards (ABES) and the Daytime Broadcasters Association (DBA). The FCC approved the jointly submitted plan, which chairman Mark Fowler described as a "substantial step forward."

Even after 6:00 p.m., the new calculation method will yield "substantial

powers" during the first post-sunset hour, the Commission finds. The NRBA has reported, however, that due to a miscalculation of power two years ago, "some Class IIs—those new since the 1983 calculations and all of those on the 1580 frequency—must decrease their power in order to avoid Canadian treaty violations."

Florida TV Stations To Pool News Via Ku

Four television stations in Florida are planning to transmit and pool news feeds using Ku-band uplink trucks. Named Florida News Network, the system is based around a complete transmission and communication package, due to come on-line around April and

intended to allow stations to easily obtain regional news while also using their mobile uplinks for other purposes.

The network's mix of stations—spanning the length of the state—provides a dramatic illustration of how Ku satellite networks can allow stations to obtain news and programming (see *BM/E*, September 1984, p. 37). WJXT, Jacksonville, and WPLG, Miami, are Post-Newsweek stations; WTSP, St. Petersburg, is owned by Gulf, and WFTV, Orlando, is an SFN station. The first three are ABC affiliates, while WFTV is with CBS.

While similar to Conus Corp.'s national Ku network, the Florida group says it plans to emphasize regional news. The four stations have been flying tapes to each other for over a year, catering to regional subjects such as Disneyworld, NASA, and, of course,

sports. Steve Flannigan, Post-Newsweek's director of engineering, says that Florida's "unique demographics" make stories on retirement communities or the citrus industry, for example, popular in some cities but not in others. Any region that has its own interests or personality, he suggests, may find the system useful.

The Florida News Network will use 4.5 m mobile uplinks from Dalsat, Microdyne downlinks, and GTE's Spacenet satellite system. GTE is delivering "a whole communications package," Flannigan says, not just feeds, with an IFB system and commu-

nication links between all stations. The system will require "as little 'master control' manning as possible; we didn't want to have to have someone around to operate it," he adds. He also reports that most of the hardware was readily available except for a satellite version of a conference caller. "When we explained to Dalsat . . . and GTE what we wanted, they said, 'We can do it, but you're the first person to ask that.'"

The stations had considered microwave, fiberoptics, and C-band, but chose Ku as the most flexible and easiest service. C-band was actually

"impossible" to obtain because of other RF, Flannigan states.

Future plans for the Florida News Network are open. It was designed for additional stations besides the four, Flannigan says, although he expects it to take up to two years to get the network running properly. And the members will be looking at "other uses" for their interconnect capability, he adds.

Each station will own its own equipment, thus allowing it to rent out the truck as an uplink for entertainment or other events. "A lot of minds are whirring over that one," Flannigan says.

RTNDA Show a Huge Success; NDs Take Control



Panelists at *BM/E-organized roundtable on New Technologies for News discuss newsroom computers. Facing camera, left to right: Rob Barnes, Turner Broadcasting; John Griffin, NBC computer operations; Sheldon Hoffman, NBC News.*

1500 paid attendees (up 300 over last year) and 750 exhibitors at the recent San Antonio RTNDA show doesn't seem like much when compared with an NAB or SMPTE. But there was no mistaking the fact that this was a powerful gathering of very powerful individuals, perhaps the most influential group in the broadcast industry today.

These news directors are taking charge—taking control of their huge capital and operating budgets, and demanding that those who intend to sell equipment and services to the news department deal with them directly, rather than through some intermediate purchasing or engineering bureaucrat.

"We were amazed," said a spokesman for Ikegami, a first-time exhibitor at the show. "We had news director after news director coming over and saying, 'We're glad you're here.'" Ikegami, and most other manufacturers at the show, found the news directors ready, willing, and able to make major

purchasing decisions from exhibitors recognizing the importance of the ND and the role of RTNDA.

On another matter, considerable hostility has arisen between RTNDA and management of the RCPC, specifically NAB president Ed Fritts, over the scheduling of next year's RCPC conference in Dallas immediately opposite the RTNDA show in Nashville.

In terms of brand-new technology, the show seldom turns up anything radically different; rather, it's a time to watch trends. Plainly the recorder/camera systems are continuing to make their biggest impact here, in the land of ENG. Extremely popular, too, were the MERPS decks (multi event recorder player systems) such as the Betacart, MVP-100, and the new DC Series from Broadcast Systems Inc. (BSI) with up to eight any-format decks.

Weather systems (particularly the doppler radar display originated by Collins) were also popular, as were, of

course, graphics systems. The Color-Graphics Artstar was among the most popular items, followed closely by the Thomson-CSF Graphics V. The Chyron booth was also well attended, as was the display of Texta, the new character generator from Dubner.

Another perennial item of interest at RTNDA, newsroom computers, was the topic of a special roundtable discussion organized by *BM/E*. Panelists included some of the country's leading users of automated newsroom systems, including representatives from all three networks and CNN. The results of the discussion will appear next month.

Meanwhile, representatives from all the news system manufacturers were present and accounted for at the exhibit. Particularly in evidence this year is the impact of the personal computer. The Quantanews system now incorporates interfaces for the IBM PC, allowing low-cost terminals to be given to field reporters. (Quanta also introduced a new wire service manager, which places high speed wires on a 53 Mbyte hard disk and distributes the information to preselected files.) The PC was also the center of attention at Basys, which introduced a PC-based version of its full-blown news system; the PC can talk with the main database and share its information. Brand-new at the show was the T.E.N. PC-based news system from Media Computing. The system, for "cost-conscious stations," has software for assignments, archival retrieval, script preparation, and producer rundowns.

Other established newsroom computer companies—Beston/McInnis-Skinner and Jefferson Data, were also on hand.

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1985: Good Year For Local Broadcasters

- Although advertising as a whole will rise 9.7 percent, local radio and TV ad revenues may rise 12 percent in 1985.
- Network revenues will rise only five percent in 1985, as opposed to 20 percent last year.
- Neither radio nor TV should expect the same kind of growth as in 1984 with its elections and Olympics.

This prediction for the success of local station revenues during the coming year is part of the cautious but generally optimistic picture of the broadcasting industry painted at Paine Webber's annual "Outlook on the Media" conference, which put the rise in network income for 1985 at about five percent as opposed to last year's 20 percent. Two speakers said local broadcasters will manage to attain increases of 12 or more percent, although it was suggested that television stations must pursue ad sales more aggressively.

Total advertising in the U.S., as predicted by Robert J. Coen of McCann-Erickson in his ritual forecast, will rise 9.7 percent this year as opposed to 1984's 15.2 percent gain. Local advertisers were often "more aggressive" than national advertisers, he warned, going from caution to "possibly excessive optimism" after the economy shot up in 1983.

As for 1985, Coen pointed out that post-Olympic years traditionally see a decline in ad dollars, which will be emphasized this year by the economy's slower growth. Cable is expected to continue its "exceptional" growth, which along with a similar trend for syndicated TV, will "add to the growth problems of the traditional TV media in 1985."

Elliott Troshinsky, vice president of advertising for Taft Broadcasting, had encouraging words about 1985 for local television stations, predicting that the local ad market will outpace network and spot markets with a 12 percent rise.

However, local stations are in a different market than they were five to 10 years ago, Troshinsky cautioned, and they must market themselves differently. He pointed out that in the past four years 110 new television stations have signed on, of which 103 are UHF's, while cable has increased its take of advertising by 42 percent since 1983. To that must be added the increases in network spots, barter syndication, and VCRs, he said.

The best opportunities for 1985 will be "new sources of ad revenues in local markets," Troshinsky stated. Television stations will be able to sign on new advertisers, in competition especially with newspapers, by improving their research, local news, and promotion to advertisers. "Increasingly, rev-

enues will flow to the broadcaster who has a local audience," Troshinsky asserted.

Putting 1984's revenue rise at 17 percent, Robert Sutton, president of Media General Broadcast Group, predicted a lesser year in 1985 for everyone except local broadcasters, who he said will see a "very green" year within a 14 percent rise.

Responding to the question of where local TV stations will find this growth, Sutton said new advertising is available from department stores, fast food restaurants, and the financial service community. Troshinsky added doctors and lawyers to the list.

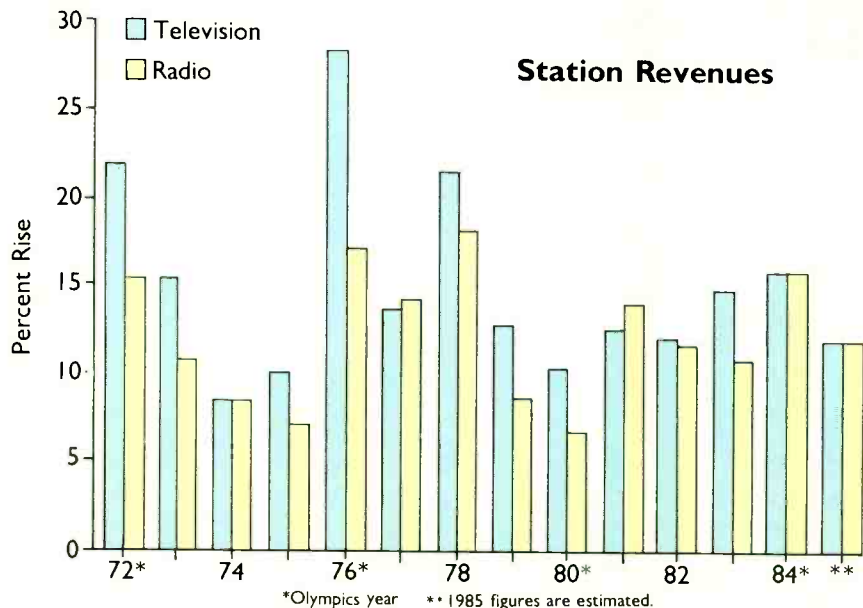
Sutton said local profits will be good if stations can hold the line on expenses in areas such as news, which must keep pace with new technology and pay the high cost of talent. He also pointed to high programming prices, rising due to increasing competition among stations and more independents. Broadcasters who feel like walking away from the bidding, Sutton warned, had better "study it long and hard." Alternatives are growing, he added, as station groups form consortiums to produce their own programming.

After forecasting a 13 to 14 percent revenue rise for radio in 1985, compared to 16 percent for 1984, Gary Stevens, president of Doubleday Broadcasting, emphasized "structural changes" in radio. Noting that the "sell-off" of radio stations has continued, Stevens predicted the speculation would continue, aided in part by the FCC's 12-12 rule change.

The Doubleday executive said that the sale of station groups to highly leveraged companies that must spin off stations to pay their debt does not bode well for the industry's health. Metromedia and Harte-Hanks, among others, have recently sold most of their stations to their own managers.

Stevens also pointed to the growing trend of adding AM stations to FMers in large markets as a selling advantage, as Doubleday has itself done in New York City.

Later in the cable session, Peter C. Newell, senior vice president of Capital Cities Cable, urged cable operators to pursue the local market. Newell said he sees the potential for ad rates equal to the highest radio station's, based on competition with both local television and radio stations.



Charts showing radio and TV local ad revenue increases over the past 12 years. Note the decline in growth following Olympics years (marked with *). 1981, the exception to the rule, showed increase in revenue over 1980 because of failure of U.S. boycott of games.

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Comsat Drops DBS; Major Blow to Medium

Satellite Television Corp., the last major company remaining from the first round of DBS applicants, has been all but eliminated from the running by Comsat, its parent company. The about-face repeats similar moves by CBS and RCA.

STC had recently said it would merge with USCI, the only currently operating DBS service, owned by Prudential Insurance and UPI's Douglas Ruhe. USCI is in serious trouble, however, with only 10,000 subscribers, and STC has walked away from the deal.

Comsat is said to have spent about \$140 million on STC's DBS plans, including two high-power satellites that are still under construction. The telecommunications company says it plans to finish building the birds at a cost of another \$40 million, and retain its FCC authorization for DBS or "related" applications.

Thus, in one year DBS's public image has gone from a powerful new medium to an expensive flop. Wall Street analysts applauded this last move by Comsat, hardly an auspicious sign for the remaining DBS applicants and a new second round who are seeking large amounts of funding.

Harris Changes Horses On AM Stereo Standard

In a major coup for Motorola, Inc., Harris Corp. has agreed to adopt Motorola's C-QUAM AM stereo standard. The two companies have signed a licensing agreement under which Harris will manufacture and market C-QUAM AM stereo exciters and monitors on an exclusive basis.

Commenting on the about-face, Harris Broadcast Group vice president Gene T. Whicker said, "The selection process of AM stereo standards has continued since 1975. AM stereo is still trying to get established in the broadcast industry, and most importantly in the domain of the listeners. We feel this agreement is in the best interest of all in making AM stereo thrive as a popular new broadcast technology.

Harris has filed for FCC type acceptance for its STX-1B C-QUAM exciter, and plans to offer an exciter modification kit and modulation monitor modi-



fication program to current Harris AM stereo stations.

Responding to this move, another AM stereo manufacturer, Kahn Communications Inc., said it has asked the Department of Justice and Federal Trade Commission to investigate the agreement for possible anti-trust violations.

In other major corporate news, Abekas Video Systems has announced its proposed merger with Carlton Communications of the U.K. Carlton's Reading, England, subsidiary IVC Carlton Ltd., a designer and manufacturer of PAL digital TBCs, synchronizers, and digital special effects systems, will assume the name Abekas upon completion of the merger.

In another development, RCA Corp. will incorporate the Nisus Video adjustable shutter mechanism into its CCD-1 ENG camera, replacing the RCA 1/500-second shutter now used. The Nisus shutter, demonstrated at last fall's SMPTE conference (see *BM/E*, January 1984, p. 81), is continuously adjustable from 1/250 to 1/5000 second while the camera is in operation.

FCC Tries Again on Television Ownership

The FCC has come out with a new version of the television station ownership limit it issued last summer, which was shot down in Congress after intensive lobbying by the movie industry and a general Congressional revolt. The new

rules allow a single owner to own a maximum of 12 stations reaching no more than 25 percent of the national viewing audience.

Exceptions are allowed for UHF stations, 50 percent of whose audiences are counted, and minority-owned station groups, which can be added on to form a total of 14.

Reaction to the new rules was mostly positive. Jack Valenti of the Motion Picture Association of America called it "a reasonable compromise," while NAB president Eddie Fritts lauded the arrangement. Rep. Timothy Wirth (D-CO), chairman of the House Telecommunications Subcommittee, also gave it his approval.

FCC commissioner Mimi Dawson, who had dissented with the original deregulation and argued for the coverage limits, said she was "pleased with the addition."

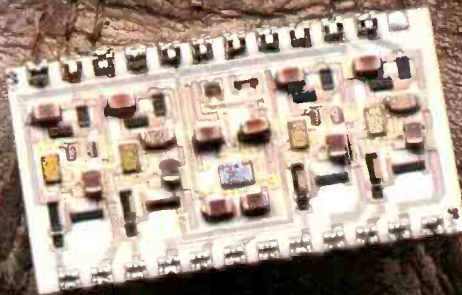
Among broadcasters, Alan Henry, president of Gulf Broadcasting Group, called the FCC's action a "positive step forward," but said he would like to see a "28-28-28 rule" or total elimination of the station quota. A population coverage cap is the only limit necessary, he stated.

Henry also predicted "lots of activity" in the television station buying market, where he said some group owners are poised either to buy individual stations or to merge with other groups and spin off excess or incompatible outlets. Gulf has been mentioned among the groups which are candidates for merger.

ABC First To Go Live With Compressed Video

On election night last fall, ABC Television became the first network to cover a live event using digitally compressed video. Signals originating at Capitol Hill were compressed from 90 to 45 million bps with NEC America's 45A encoder/decoder and transmitted via fiberoptic cable to the network's master control facility in New York.

ABC equipment planning engineer Kevin Dauphinee said the system maintained "extremely high quality" while reducing the requirements of transmission line capacity. NEC reports that the 45A CODEC provides simultaneous video at 60 dB S/N and two-channel audio of 50 to 15,000 Hz bandwidth.



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PV40x13.5BIE for 30mm and 25mm cameras. The Olympian—proven at the 1984 Olympic Games, its 40X reach is perfect for sports and all outdoor broadcast operations.
Focal length: 13.5-540mm (27-1080mm w/built-in extender)
Max. Relative Aperture*: 1:1.7 through 270mm
*25mm format 1:2.8 at 540mm



P18x15BIE for 30mm and 25mm cameras. The Widest—a very wide 60° angle of view plus incredible edge-to-edge sharpness, fidelity and sensitivity. Supplied with 1.5X and 2X built-in extenders plus pattern projector.
Focal length: 15-270mm (30-540mm w/2X extender)
Max. Relative Aperture*: 1:2.1 through 218mm
*25mm format 1:2.7 at 270mm



J20x8.5BIE for 2/3" cameras. Two Assignments—use a 13X zoom for ENG, use the J20x8.5BIE for studio or outdoor broadcast assignments—with the same 2/3" camera!
Focal length: 8.5-170mm (17-340mm w/2X extender)
Max. Relative Aperture: 1:1.6 through 130mm
1:2.1 at 170mm



J15x8.5BIE for 2/3" cameras. 2/3" Economy—full utility for all studio situations, combining a 15X zoom ratio with an M.O.D. of under two feet, a 54° angle of view and high sensitivity throughout the range.
Focal length: 8.5-128mm (17-256mm w/built-in extender)
Max. Relative Aperture: 1:1.6 at all focal lengths

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P12x14BIE for 30mm and 25mm cameras.
Studio Standard—the preferred choice in studios across the country, combining high sensitivity with incredible edge-to-edge sharpness.
 Focal length: 13.5-162mm (27-324mm w/2X extender)
 Max. Relative Aperture*: 1:1.6 throughout the entire zoom range
*25mm format



PV14x12.5BIE High Resolution Lens for 30mm and 25mm cameras.
A Unique Design—featuring extensive use of Fluorite lens elements, this lightweight, compact 14X studio lens provides high sensitivity and critical sharpness at all focal lengths.
 Focal length: 12.5-175mm (1.5X and 2X extenders built-in)
 Max. Relative Aperture*: 1:1.6 at all focal lengths
*25mm format



J25x11.5BIE for 2/3" cameras.
Greater Reach—a 25X zoom lens designed specifically for 2/3" cameras. The power and scope of 1" systems, the economy and efficiency of your 2/3" cameras.
 Focal length: 11.5-288mm (23-576mm w/2X extender)
 Max. Relative Aperture: 1:1.6 through 220mm
 1:2.1 at 288mm



J18x9BIE for 2/3" cameras.
Greater Reach, Lighter Weight—nothing matches the 18X zoom power of this lens—and it weighs less than 4 lbs.! It increases the flexibility of any portable camera.
 Focal length: 9-162mm (18-324mm w/2X extender)
 Max. Relative Aperture: 1:1.7 through 116mm
 1:2.4 at 162mm



J13x9BIE for 2/3" cameras.
The Portable Standard—used by cameramen around the world under all conditions, the J13x9BIE is a proven performer with superior sharpness and sensitivity.
 Focal length: 9-118mm (18-236mm w/2X extender)
 Max. Relative Aperture: 1:1.6 through 99mm
 1:1.9 at 118mm



J15x9.5 for 2/3" cameras.
Quality plus Economy—you can't buy more lens for less money. Lightweight and sensitive, it meets the needs of both cameramen and accountants yet lives up to its Canon name.
 Focal length: 9.5-143mm
 Max. Relative Aperture: 1:1.8 through 112mm
 1:2.3 at 143mm

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NEWS

Optical Disc Seen as Possible Broadcast Recording Medium

No broadcasters were present as witnesses, but exhibitors at the 1984 Videodisc, Optical Disk, and Compact Disc Conference held in Washington, DC, in December were showing key elements that could usher in a new wave of low-cost but flexible plants for radio and TV. Among the promising prod-

ucts were the Recordable Laser Videodisc (RLV), shown by the Optical Disc Corp. of Cerritos, CA (see *BME's* SMPTE report, January 1985, for more information) and a multiple cartridge video disc access system, capable of automating a TV station for "months of playing time," shown by Destron, Inc., of Chicago.

Another exhibitor was Spectra Image of Burbank, which was involved in producing the Ampex ACE laser editing system at the last NAB show. It

demonstrated some dazzling station promos produced using Optical Disc Corp.'s RLV direct-read-after-write DRAW system. At the same time, the Spectra Image company announced that its affiliate, LaserEdit, would soon have a production version of the Spectra-ACE edit system for service contract work.

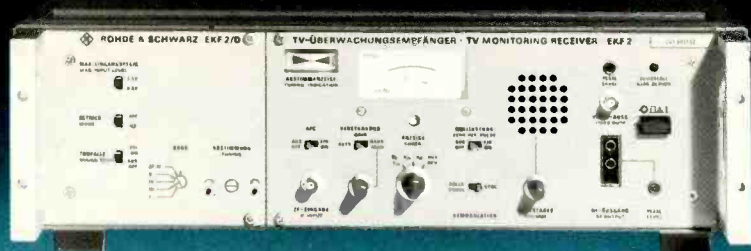
Numerous exhibitors and conference panelists were showing and discussing extendable CD music discs and CD ROMs. These included Sony, Philips, Matsushita, Hitachi, and Denon. Unused sectors of the 120 mm CD currently have the capability to record 4500 mono still frames or 350 in full color, just waiting to be exploited by creative programmers, according to Almon Clegg of Matsushita. He reported that Technics would soon have a multidisc CD player, the SL-P15, that could jump back and forth freely between any track on any of 50 compact discs or play 60 hours of uninterrupted music. Couple this with a personal computer and radio broadcasters have no problem in envisioning a new station automation system. Commercials can be incorporated using DRAW CD equipment which, while not available yet, is not far away according to the CD makers.

While CD ROMs are viewed primarily as data storage devices, they nonetheless offer radio broadcasters the exciting possibility of getting into electronic publishing via SCA. Dennis Kulvicki, president of Public Teledelivery, outlined at the conference a CD-ROM based scheme for distributing information to schools, businesses and homes. Downloading microcomputer software is one application, since one CD ROM is the equivalent of 1000 floppy disks. It was made clear at the optical disc conference that CD ROMs are nearly identical to CD music discs and compatible with them.

The principal drawback of the new media has been the laborious and costly steps necessary to replicate discs. DRAW equipment heretofore available, such as the Panasonic OMDR, has had a high disc cost (\$750) and a modest density (24,000 frames). Now the industry seems at the threshold of overcoming these past barriers. The Optical Disc RLV costs \$75 per disc and stores 54,000 still color frames or 30 minutes of video motion. While the bandwidth and S/N do not match that of one-inch C band magnetic tape, S/N is improving.

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NEWS BRIEFS

NBC says it is dumping its **teletext service** since a low enough priced NABTS decoder has not been developed. The network said it would get back into the field if one became available. CBS is still operating its Extravision service.

The Electronic Media Rating Council has recommended that Arbitron not institute a cooling off period for **hot call letters**. The ratings company

should take steps to minimize diary keepers' confusion over recently exchanged letters, the council suggested, but a recent survey found that five out of six stations which had picked up hot letters actually declined in audience.

In a recent Torbet Radio survey, **agency media buyers** said station activities that most interest them are, in descending importance, local promotions, community involvement, the sta-

tion's ad campaign, and the local account list.

Cable and pay television companies experienced a profit margin decline of 25 percent over the five year period ending in 1983, mostly in the first two years, according to a new report by Veronis, Suhler & Associates, a New York investment firm. The figure is based on 30 companies in the field. The companies also produced 45 percent compound annual revenue growth and 35.3 percent compound pretax operating income growth.

An agreement has finally been reached with Mexico to permit most U.S. **Class IV stations** on local channels to increase nighttime power from 250 W to 1 kW. A similar accord had been reached with Canada, so all three countries are now able to boost power Canada and the U.S. have formally signed the new Working Arrangement under which the past year's **FM power increases** have been determined. This accord supersedes the previous FM Agreement of 1947.

NEP Productions is producing an ongoing series of radio spots promoting the network's television lineup **Editel/LA** did the post-production work on Budweiser's "Window Washers" and "3-D" spots, which were lensed by William Dear of Production Partners. Editel says it ran up to six machines simultaneously plus ADO. . . . **Varitel Video** is to do post-production for D.Y. Productions' *No Guts, No Glory*, a 6x30 sports series.

Meredith Corp. has announced it will buy Carson Broadcasting Corp., which owns KVVU-TV in Henderson, NV. Meredith already owns seven television stations, but had anticipated the FCC's rule change (see News).

An entry call for radio's **Armstrong Awards** has been put out under the categories of music, news, news documentary, public or community service, education, and creative use of medium. Deadline is April 1. Ask for Munire Terpis at (212) 280-8703.

AES has announced the dates of its spring show, which will be held May 3 to 6 in Anaheim. . . . The **Computer Graphics conference** will take place April 14 to 18 in Dallas. Call (703) 698-9600. . . . The **LA Professional Video Show and Video Production Conference** will run May 20 to 23. Contact Lisa Welp at (203) 743-2120.

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Frequency increment and decrement keys sweep the operating frequency in 1, 10, 100 or 1000 kHz steps.

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- Receiver/generator isolation: >120 dB
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- Receiver sensitivity: 5 micro V nominal

OIB-1

The **Operating Impedance Bridge** measures the impedance of networks, radiators, and the like while they operate under full power. VSWR as well as complex impedance of up to 400 ohms \pm j300 ohms can be measured.



- Frequency Range: 500 kHz to 5 MHz
- Through Power Rating: 5 kW Modulated 10 kW Carrier only
- Accuracy: R and X, 2%, \pm 1 ohm
- Direct Reading in R: -400 to +400 ohms, standard -1000 to +1000 ohms, optional
- Direct Reading in X: -300 to +300 ohms, standard -900 to +900 ohms, optional
- Measures VSWR: $Z_0 = 0$ to 400 ohms

OIB-3



The **OIB-3 Operating Impedance Bridge** provides extended resistance and reactance ranges, measuring up to 1000 \pm j900 ohms. The bridge has a built-in carrying case and RF amplifier for improved nulling.

- Frequency Range: 500 kHz to 5 MHz
- Through Power Rating: 5 kW Modulated 10 kW Carrier only
- Direct Reading in R: -1000 to +1000 ohms
- Direct Reading in X: -900 to +900 ohms
- Accuracy: R and X, 2%, \pm 1 ohm

CPB-1 (5 kW), CPB-1A (50 kW)

The **Common Point Impedance Bridge** is designed for permanent installation. It allows continuous monitoring of the common point, thus facilitating network adjustment. This model can be provided with one of Delta's TCA ammeters mounted in the front panel.



- Frequency Range: 500 to 1640 kHz
- Power Rating: CPB-1, 5 kW CPB-1A, 50 kW
- Resistance Measurements: 30 to 100 ohms Range \pm 2%, \pm 1 ohm accuracy
- Reactance Measurements: \pm 50 ohms (1000 kHz) range \pm 2%, \pm 1 ohm accuracy

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RADIO

programming & production

Children's Radio Network: Programming Just for Kids

By Michael Greenhouse,
Associate Editor

Children 12 years old and younger make up the largest demographic group in the U.S.; they comprise about 15 percent of the total population—over 34 million people. This fact has not been lost on today's television programmers, who gear much of their video fare to this group and reap a huge reward: about \$400 million per year in advertising revenue.

One could argue that this statistical tidbit has been lost on today's radio programmers, however. The medium that once entertained millions of children with "theater" like *Flash Gordon* and *The Thin Man* now offers children only music and "adult talk," while television dominates the child entertainment airwaves with both animated and live action cartoons, like *The A-Team*. And information for kids—"classrooms" like *Sesame Street*—is nonexistent on radio. Since the early 1950s radio has, for the most part, abandoned a market that manufacturers and retailers want desperately to reach.

Until now, that is. On December 1, 1984, WEXI-AM, Jacksonville, FL, became the first station to air Children's Radio Network programming, known as the Educational Sensational Radio Oz (AAHS). When WEXI began "doing all the good stuff radio does," as the slogan goes, it in essence became a "test" station and Jacksonville a test market for the first full-time radio programming service designed exclusively for children in about 30 years.

A natural addition

The decision to take on Children's Radio Network programming was not a difficult one for the station, according to general manager Pat Hayes. The station's format, prior to the addition of CRN programming, was based around old-time radio shows. Hayes feels the



Executive producer Skeet Bushor mixes a show at TRC Studios, Indianapolis.

CRN programming, which is aired from 6:00 a.m. to 5:00 p.m. seven days a week, is an excellent complement to the old-time programming, which has been moved to nighttime. In terms of marketing the station, Hayes can now offer advertisers two groups of listeners—children and adults—instead of just one. And in terms of program content, the services are complementary in that both offer a "theater of the mind" experience. "The television age took us away from theater of the mind," he says. "Old-time radio shows are theater of the mind, though. And Children's Radio Network revives that."

School system cooperation

WEXI went on the air in December with about 50 pretaped CRN programs available for its use. Many of these pro-

grams are theatrical—the lineup includes "Robin Hood," *Aesop's Fables*, *Grimm's Fairy Tales*, and "Michael Jackson's E.T."—but many are educational as well. Both kinds of programming are meant, ideally, for group listening; in other words, CRN's programming is intended for the classroom—at least some of the time.

Obviously, the cooperation of the school system is needed for this to occur; in Jacksonville, this has not been a problem, despite the fact that commercials are aired along with the programming. Hayes says the school board is "ecstatic" about what CRN president William Osewalt calls the network's "teacher-assist educational format." The network provides to the schools program schedules, as well as study guides for teachers. Incidentally, none of the material is produced without the prior approval of child development authorities. Also, all CRN programming meets NEA standards.

The production process

Over 60 percent of CRN's programming is prerecorded material, like *The Muppets* and "E.T.," which CRN has acquired for its package. The rest is produced by the network. The heart of the original production operation is in Indianapolis; TRC Studios and Soundsmith are the most-used facilities.

Skeet Bushor, executive producer of CRN, is in charge of all CRN production. This means he produces and post-produces many of the projects himself, and oversees what he doesn't produce. But also, along with Osewalt, Bushor makes sure a particular project accomplishes—in terms of content—what CRN has set out to accomplish. "The basis of our format is to be stimulating," he says. "And we want to teach kids to listen." But in teaching anything, Bushor says the network is "moving away from talking to someone." He points to the network's

RADIO PROGRAMMING

Lunchtime and Afternoon theaters which, he says, are not "authoritarian presentations. We don't use authoritarian radio voices. We relate as friends." Another production, *Alphabet Soup* (a collection of educational tunes), features a child's voice. This way the show is friendlier, says Bushor.

The half-hour show "The Voyage of the Mayflower" is another good example of friendly teaching—history as en-

tertainment, as Bushor says. The production began, as all CRN productions do, with a script assignment. A writer was brought in to write "something that tells what the whole voyage was about without sounding like a textbook," says Bushor. Then came a process of script approval. A group of educators affiliated with the network read the script for historical accuracy, and to make sure there was nothing in it that would offend a child.

Next, seven actors were hired, and a studio, Soundsmith, was booked. Bushor says this aspect of the production was not typical for radio, because the voices were recorded in a music studio, not a voice-over room. The music studio allowed for more physical distance between actors, "so you can get gestures happening without slapping someone in the eye," says Bushor. "I like to give the actors the freedom to move and be expressive," he continues. "That energy shows on the tape. Also, when we record someone we want it to be interactive with the listener."

The voices were recorded on a Studer 24-track recorder, and mixed on a Neotek board. Music, cowritten by Bushor, was also recorded, edited, and, in mixdown, crossfaded with dialog where appropriate. The finished product was mastered to an Otari two-track machine.

Release format

All CRN tapes run at 7.5 ips, and are 56.5 minutes long. As Bushor puts it, "We establish a set it and forget it situation for engineers." In this engineer-assist format the network provides the station with a time log of each tape. The log starts at zero and ends at 56.5. CRN recommends that stations use a 4200 Series Tascam or an Otari M5050 playback machine. Both have digital time readouts, so that all an engineer has to do is load the reel, cue it to the first sound, zero the counter, and the counter will coincide with the log sheet.

Advertiser and listener response

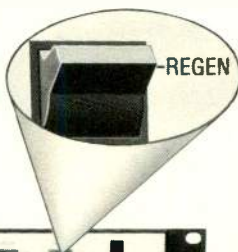
At press time WEXI had been airing CRN programs only a short time, so it was difficult to gauge the response of listeners and advertisers. On advertisers, Hayes says, "Thus far, on a scale of one to five, it's a three right now. But the reaction has been, this is a good concept. I want to be on it."

CRN's business strategy, according to Osewalt, is to get its programming onto 300 AM stations in 300 markets nationwide. In addition to Jacksonville, Osewalt says the service will be in 27 other cities by the end of this month. If Osewalt's business strategy takes off, it seems children will have an opportunity to exercise some of the aural skills inside them that may have been dulled by television. **BM/E**

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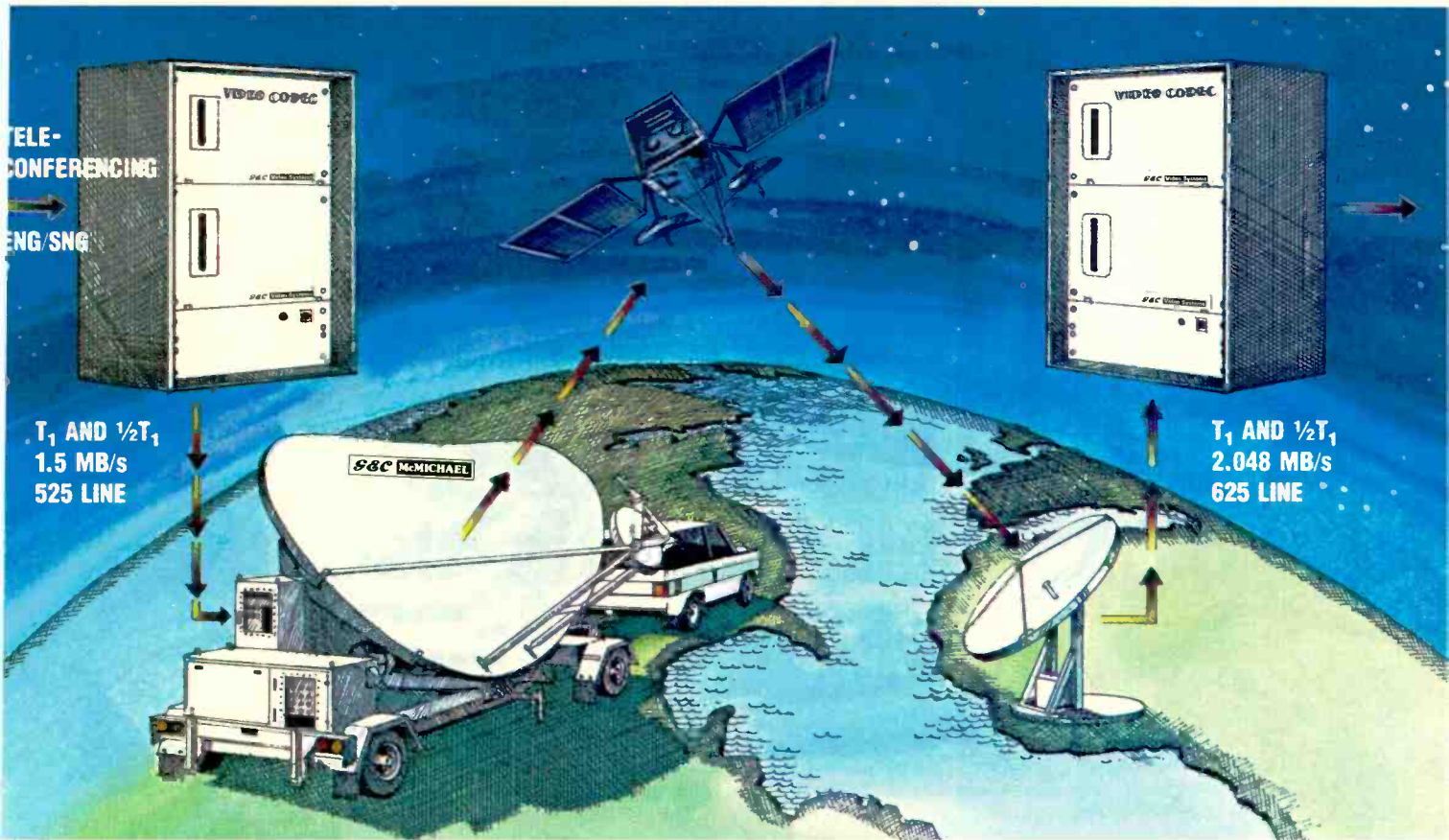
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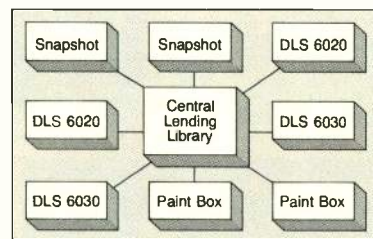
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TELEVISION programming & production

CBC's Papal Visit Coverage: Bigger than the Olympics

By Derick Harris

What has been called the most massive and complex broadcast undertaking anywhere began with a casual conversation between two men who probably knew very little about radio and television coverage of events that have worldwide proportions.

The conversation occurred in Rome in the spring of 1982. The setting was Vatican City where Emmett Cardinal Carter, head of the Roman Catholic Archdiocese of Toronto, Canada, was present at a meeting of church officials with His Holiness Pope John Paul II.

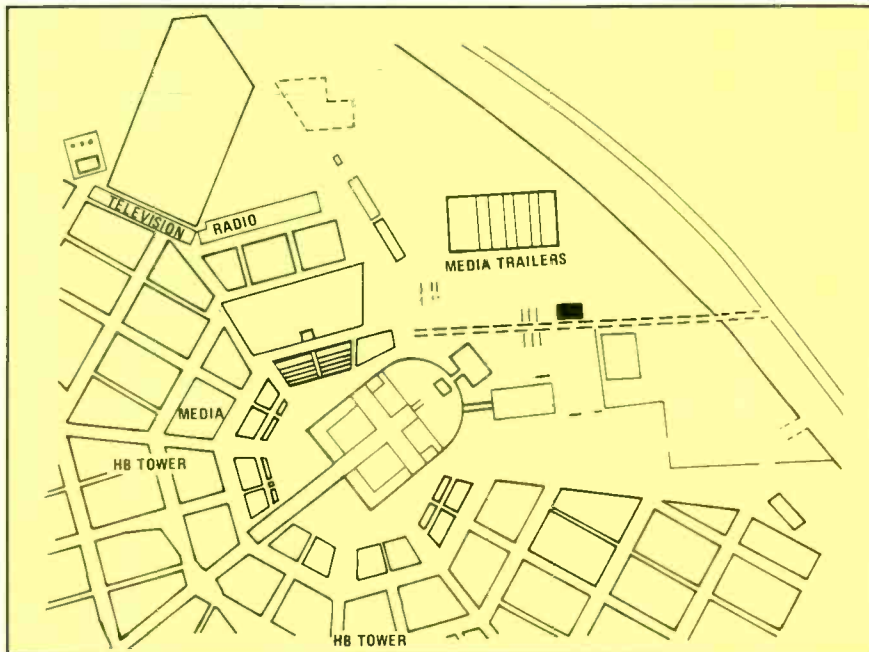
The encounter between the Canadian Cardinal and the much travelled Pontiff set off a sequence of events which has been described by the Canadian Broadcasting Corporation as "the most widespread radio-television broadcasting coverage ever."

The job of coordinating the CBC's massive coverage of the Canadian papal tour was given to David Knapp, a career broadcaster and whiz kid of CBC large-scale projects such as the network's role as Host Broadcaster for the 1976 Montreal Olympics. Knapp's assignment was to organize logistics and carefully plan the technical elements for a papal pilgrimage that involved 110 hours of live television coverage of 60 separate events, over 12 consecutive days, in 13 different cities, over a combined distance of about 10,000 miles.

As it turned out, the Pope's schedule left Knapp with only 10 months to requisition personnel, find the necessary equipment, organize transportation and plan each setup for an operation that was larger than ABC's coverage of the 1984 Olympics, and would reach about 700 million people in 14 foreign countries around the world. These figures do not include the domestic Canadian audience, which the CBC has pegged at



Handheld cameras keep pace with Pope during 10,000-mile odyssey.



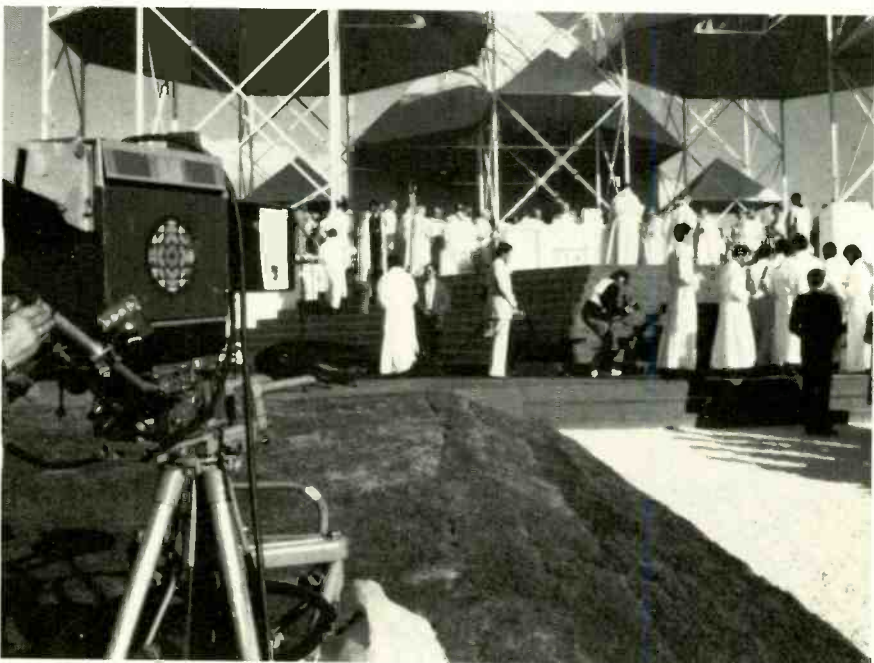
Site coordination plan for outdoor mass at Toronto's Downsview airfield. Host broadcaster (HB) CBC provided a 55-foot remote unit with five Ikegami HK-312Es and four HL-79 cameras, all with Canon lenses; a CDL 480-10 24-input switcher; Ward Beck 24 by 6 by 2 audio mixer; Ward Beck 48 by 48 intercom; and 4500 feet of triax. Note locations of mobile unit parking, radio and TV announce booths, and microwave masts.

Derick Harris is a freelance writer based in Toronto.

TELEVISION PROGRAMMING



Cameras were cabled to production vans with a million feet of audio and video cable.



One of the 300 cameras used by the CBC to cover the Pope's Canadian visit.

Production Requirements for Papal Visit

- 110 hours of live coverage
- 370 camera locations
- 300 cameras, fixed and handheld, including three Steadicams
- 60 events covered in 13 cities over 12 days
- 23 CBC mobile units borrowed from French/English networks
- 29 mobile units rented
- 1500 technicians and production staff
- 1600 microphones (shotgun mics on handheld cameras)
- 400 telephones
- 10,000 miles travelled by crews and equipment
- 75 portable microwave towers for TV transmission
- 7000 television lights
- A million feet (approximately) of audio & video cable
- Two Helipacks: helicopter-camera car-popemobile camera linkups

Knapp had the use of two Hercules air transport planes, a Canadian Government DC-8 jet, and a variety of other leased aircraft and helicopters. The two planes were used to airlift specially designed helicopter/mobile units—called Helipacks—which were leapfrogged around the country with two "popemobiles" in order to keep one stop ahead of the papal itinerary. Each Helipack consisted of a camera in the popemobile, a camera in the host broadcaster lead car, and a camera in the chopper.

Crews assigned to work with Knapp were confronted with a range of demanding production problems—from the air-to-ground motorcade coverage to complex setups at giant outdoor masses, complicated lighting situations for church interiors, the use of Steadicams for papal walkabouts, and nighttime coverage conditions at several giant rallies held in Montreal, Toronto, and Vancouver.

According to Knapp, the CBC appropriated "every piece of equipment in Canada we could get our hands on." In addition to the gigantic equipment pool, the CBC built media centers for editing and other production require-

13.6 million viewers. An additional 10 million listeners are thought to have been reached by Radio Canada International, which offers shortwave services in 11 languages beamed to Africa, the Caribbean, Europe, the Far East, and North and South America.

Knapp was removed temporarily from his job as assistant managing editor at the CBC's national news unit in Toronto in order to assemble the broadcast team for the project. He draws a

deliberate but friendly comparison with coverage of the Los Angeles Olympics. "You've got three to four years to plan for an Olympics," he says. Despite his 24-year career in broadcasting, and the fact that he has covered many of the CBC's big projects, he candidly admits that "I don't think any of us realized how big this thing was we were getting ourselves into." (See panel on production requirements.)

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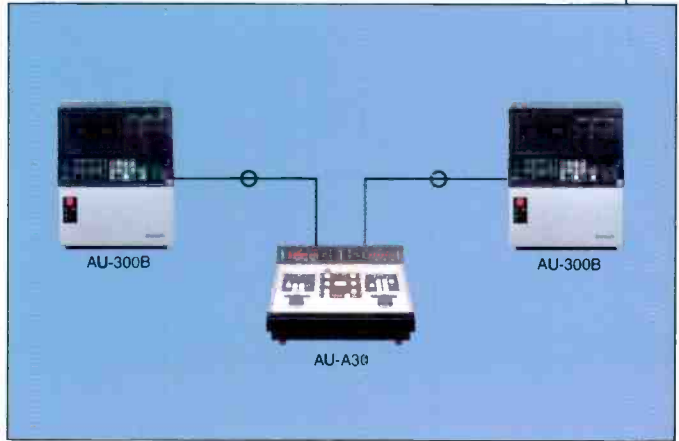
behind component compatibility.

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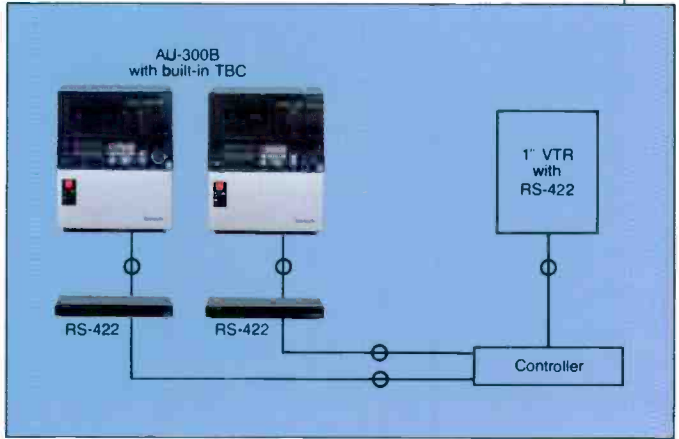
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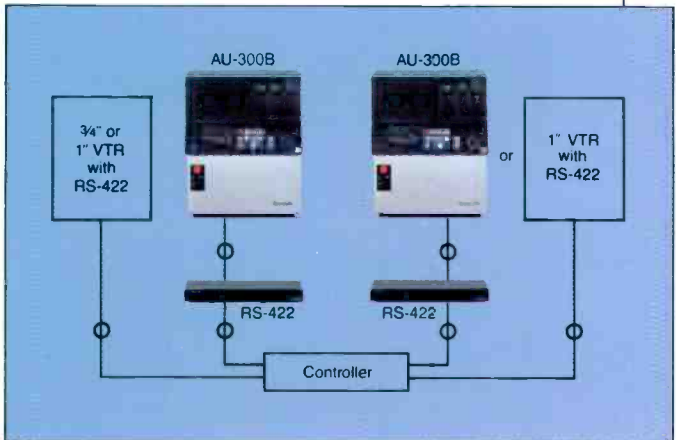
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TELEVISION PROGRAMMING



Interior of one of 52 mobile units used by CBC for coverage.

ments, including the international audio and video feeds at every major stop, and television anchor positions at each of the 60 venues.

The CBC provided pool coverage to

14 countries outside Canada: Austria, Belgium, Brazil, France, Germany, Great Britain, Ireland, Italy, Luxembourg, The Netherlands, Trinidad, the USA, Venezuela, and Vatican City. The audio feeds included English and French translation, including "international sound" (without commentary). In the U.S., NBC coordinated network TV and radio pool coverage, as well as PBS and S.I.N. satellite feeds which went via Intelsat to EBU countries. Telesat Canada and terrestrial microwaves were used for the U.S. feeds.

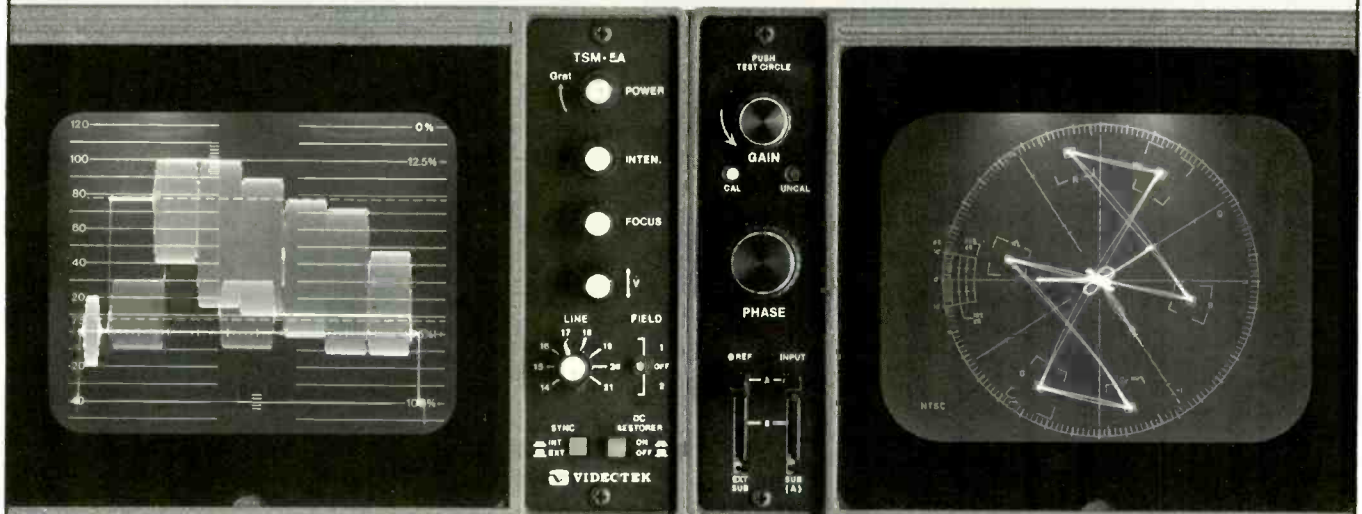
Given the magnitude of the project, and the severely limited time frame for preparation, Knapp is amazed that technical problems were kept to a minimum. The most serious problem during the itinerary was the cancellation of the Pope's visit to Fort Simpson in Canada's Northwest Territories. The situation became dangerous for the papal jet because of extensive fog which had developed after the television crew and equipment were already in place on the ground. According to Knapp, who was in the chartered plane with the Pope,

the decision to scrub that event was made by the Pope himself after the plane ran low on fuel and was forced to divert to Vancouver.

The biggest worry, according to Knapp, was the possible failure of the Helipack which was used extensively during the Pope's trip. The pope-mobiles, which were built especially for the Canadian tour, both had a robot camera inside, but no sound. Each camera was linked to the CBC camera-car in the motorcade and to the helicopter overhead. The shots from in front of as well as inside the pope-mobiles were fed to the chopper, and then to the nearest CBC feed position for the satellite uplinks. Another helicopter hovered about a thousand feet higher for aerial wide-shots of the Helipacks in action. Knapp's "big worry" functioned perfectly throughout. Wild sound in the motorcade was provided from the camera-car.

All things considered, would he do it again? "It was a great challenge," says Knapp. "I would do it again of course." **BM/E**

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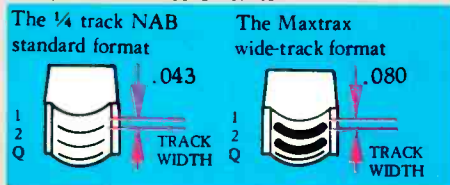
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HOW MUCH?

The Micromax reproducer with Maxtrax heads is only \$1,445.00 FOB Carlsbad, California — where we manufacture it. A recorder version will be available soon and we fully expect it's price to be as affordable as the reproducer-only model (stay tuned).

A Tomcat sits comfortably above the rest of the pack, but the new Micromax could be the purr-fect alternative for you. Either way, you can't lose.

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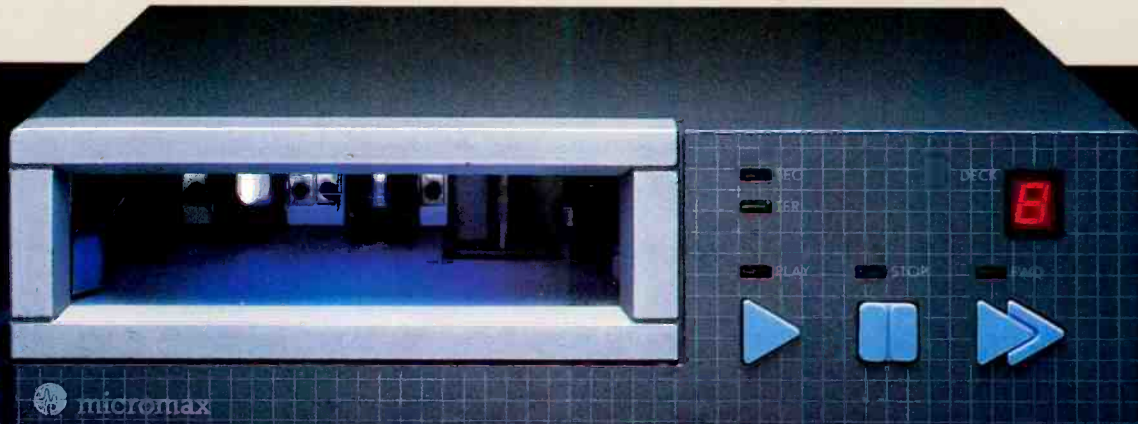


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38 Exclusive Predictions For NAB '85

Psychics have had their say in the popular newspapers. Now *BM/E*'s editors gaze into the crystal ball and predict some of what may be in store for NAB '85.



Staff Report

Components, components everywhere. This is going to be the year of the analog component in television, with just about every broadcast and teleproduction organization looking at some aspect of component TV. It's going to be far-ranging; from recorder-cameras in half- and ¼-inch formats, to analog component MERPS decks for on-air playback, to graphics systems capable of RGB or another component output. Hottest product is likely to be the *new* Grass Valley analog component switcher, based on the miraculously compact Model 100, but handling analog components instead of NTSC. This switcher joins the Shintron and Crosspoint Latch models already on the market, as well as GVG's own Model 1600 version of the analog component switcher . . . There is also a rumor that Panasonic will introduce a small component production switcher . . . also expect For-A to introduce the CVM-500 component production switcher (and composite version, PVM-500), both primarily for post-production. For-A to also unveil component TBC.

In other analog component developments: Digital Services Corp. to show Illusion multichannel digital video effects system in new component version. System will also feature new low-cost still store option, and some new effects . . . Philips Test & Measurement will introduce PM 5633 sync pattern generator with component video output. (Also the PM 5652 NTSC-7 VITS generator inserter with external signal input) . . . Even Winsted has decided to climb aboard the analog component bandwagon, with a new storage system for the Sony half-inch Betacart MERPS system, and new dubbing racks for the half-inch tape format.



Howe Audio will add three-band EQ on every channel of 9000 Series consoles Audiotronics will have production model of 300 Series console introduced last year as prototype Pacific Recorders won't reveal details of "Project X"—top secret new development in another direction than carts and consoles.



Lots and lots of new, ever-more-sophisticated graphics products. Beston/McInnis-Skinner will launch new high-resolution improvement for Weathergraphics: 1920 pixels H resolution—"higher than anyone else's." . . . Look for an expanded digital still store product from NTI.



Ramko consoles get sexier and sexier, with new CRT-based digital graphics display of VU? PPM? Something else? . . . JBL/UREI, in departure from production orientation over last couple of years, will feature five- and eight-channel on-air broadcast consoles . . . Soundcraft, too, to introduce SAC-2000 on-air board, along with 20 Series ATR introduced at AES . . . Arrakis to unveil Model 150 SC six-channel 18-input console for small radio stations, introduced at RCPC; priced at \$1995.


5

Lots of changes among some old friends: Broadcast Microwave Services (BMS), recently bought by Cohu, has big plans to expand from last year's \$3 million in sales to \$9 million this year. Will introduce a 12 v micro-miniature

ENG transmitter; a gyro-controlled Loran helicopter system; an entire family of automatic tracking antennas for news and sports; and a new multipolarity truck transmit antenna.

Comark, now exclusive distributor in U.S. for Marconi's RF products, will promote them heavily. Also will introduce "most energy efficient UHF transmitter manufactured in the U.S.," the Comark "S" Series, from 10 to 240 kW, featuring the Comark/Marconi high-tech modulator.

No-shows will include Precision-Echo, which is concentrating on its military business; Vectrix, which can't make an active commitment to the broadcast industry yet; and PEL and Broadcast Technology, Inc. which have gone out of business.


6

With ATR/VTR synchronizers making news all over, Evertz Microsystems will have a couple of hot new products: a new chase synchronizer priced lower than competitive models; and an sch phase meter with ability to adjust time

code phasing. Evertz, a Canadian company, represented in U.S. by Amtel Systems, first time NAB exhibitor . . . Otari will show new remote controller for the EC-100 editor code synchronizer.


7

With the Harris decision to adopt C-QUAM, Motorola has high hopes for stimulating wave of AM stereo conversions at NAB. C-QUAM-only receivers from five OEM and 10 aftermarket manufacturers are expected, including

Ford, Nissan, Pioneer, and Potomac Instruments. Several cars, one inside the hall, will demo the Motorola standard using either KMMJ, Las Vegas or a temporary transmitter.


8

Digital audio's the thing wherein we'll capture the conscience of the broadcaster. Eventide, quiet in product development for a while, will be showing a new Harmonizer, the H969, as well as a family of new digital audio delay products with advanced features . . . Gotham Audio will have the EMT digital disk storage system, which uses removable Winchester disks for one to five minutes of digital audio storage.


9

This was to be the big year for nonvideotape based recording, with Abekas, MCI/Quantel, and PEL all to show systems. But Henry from Quantel, a RAM-based recorder for animation and/or editing, still won't be a product and will only be shown in a suite. And PEL has gone out of business. So Abekas alone has a digital recorder—based on Winchester drives, for 50 to 100 seconds recording time. Make plans to visit the booth early—it's going to be packed!


10

Otari said to be working on "whole package of new products" in addition to AES-introduced MTR Series and MX-70 ATRs . . . Studer will highlight A820 tape transport introduced in prototype at AES . . . Nagra hopes for production models of T-Audio machine with SMPTE time code retrofit, as shown at SMPTE. Will also have the 4-STC portable SMPTE time code unit.


11

Character generators at top of many broadcasters' shopping lists, and manufacturers will respond. Laird will have brand-new Model 1500 with 35 nano-second resolution, 65,000 colors, 70-font library, dual disk drives, proportional spacing, etc . . . Pesa America will show its CG-4721 character generator, now in production with new addons not seen last year . . . Dubner with first NAB appearance of Texta, its new character generator system . . . Quanta featuring camera-based font compose for its Q8 character generator, with software based fonts for maximum flexibility . . . Beston/McInnis-Skinner to introduce Marquee 1000 lower-end character generator (to compete with Quanta Microgen), priced \$3000-\$4000.


12

Videotape's on everyone's mind, with the race on to develop a longer (30-minute) version of Betacam or M-format cassettes for MERPS systems. No one's announcing NAB plans yet. A major tape manufacturer may be introducing a brand-new one-inch tape, but still too early to promise . . . Meanwhile, 3M is eyeing possibility of incorporating new antistatic manufacturing process for 3/4-inch U-matic tape cassettes. It has already introduced the formulation on Betacam and M-format tapes, with amazing results: far, far less static in the shell and key interior moving parts, meaning far less noise and dropouts on the tape . . . To erase the new generation of high-density tapes, CMC will show TD-600 bulk tape demag-



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netizer capable of handling all current open-reel and cassette formats.



Basys set for continued newsroom computer push with Basys Basic—IBM-PC version of Basys system introduced at RTNDA. Operates as stand-alone terminal or in communication with main system . . . Colorgraphics

NewStar to feature automated control of tape machines, character generators, and still store graphics using sophisticated machine control system—for the fully automated newsroom.



NEC stronger than ever in digital processing and CCD camera technology. Expect several new advances for E-Flex/Optiflex digital effects system, with popular software modules (instant cube formation, picture cropping, etc.

unveiled at SMPTE). In CCD camera arena, NEC continues to make sales and inroads, especially with RCA experiencing marketing difficulties. (RCA has contracted with Nisus to develop new approach to slow-motion camera shutter system.) . . . Microtime will make first NAB introduction of SMPTE-introduced Genesis digital special effects system—really something to see, with low-cost effects produced using basic Microtime TBC/frame sync . . . ADDA big product will be AC-21P single-channel TBC/frame sync with digital effects, plus low-cost version of the ESP still store. Company is also said to be working on a “major new product area,” but won’t reveal any details . . . Fortel, too, working on new effects and options for its digital effects system.

Meanwhile, when will Tektronix come out in the open with full-scale frame synchronizer product, including effects? So far has shown the basic framesync and audio/video sync delay system. Reorganization at Tek, creating a new business unit, suggests the system may be on its way very soon.



Having found recognition in professional high-res monitors, Sharp will add 19-inch, rackmount nine-, and twin nine-inch monitors to line . . . Pesa America will bring a newly developed line of high quality monitors.



TV stereo manufacturers are coming out all over. Orban will feature live, closed-loop demonstration of TV stereo complete with stereo generator, audio processing, and (probably) SAP channel . . . Wheatstone to introduce

TV-80 TV stereo audio/SAP console. Plus TV-oriented DA-16 and DA-8 audio DAs . . . Hot new console from ADM will be the S/TV stereo console, priced \$30,000-\$45,000. Also the ST console for FM and small-market TV, and Post Pro 12 mixer introduced at 1984 SMPTE . . . LPB to unveil “totally new console line, budget priced, ‘rugged and reliable,’ ” in six-, eight-, and 10-channel stereo, all dc-controlled . . . Wegener will show product modifications for MTS/stereo TV STLs . . . Sigma to show new stereo audio DAs, plus new sch meter.

Neve eyeing TV stereo market to introduce major changes on 51 and 542 Series consoles to make them more suited to stereo. Will also formally launch Necam 96 console automation system, under development for some time . . . Expect SSL to reveal complete details of SL 5000H multichannel TV audio console, with production units expected to include special stereo imaging and perspective controls, multiple independent stereo outputs, and instant reset computer controlling all switching within console.

Expect a whole raft of new test equipment for measuring TV multichannel signal. Confirmed product development from RE Instruments. But Belar is also probably working on something . . . Asaca to introduce TA-35A TV sound signal generator . . . Broadcasters aren’t used to the dbx noise reduction system yet, and need all the help they can get with test and measurement. “This isn’t AM stereo, guys.”



Asaca with big, big plans for NAB this year: ACL-6000B MERPS system (600 cassettes); ADS-2000 still store (5600 frames); AIP-1320 still image transmission system; plus complete line of HDTV equipment, including HDTV test signal generator, TV test pattern generator, monitors, color encoder and decoder, and sync generator.



This will be the year for the 24-bit graphics system, thanks to the availability of some new low-cost chips. Manufacturers will make new systems available incorporating increased color and resolution as soon as possible: From Colorgraphics, the ArtStar II, priced “under \$100,000.” Incorporates full-color digitizer with remarkably lifelike reproduction, plus full 3D composition, extensive color cycle animation capability, 250,000 displayable colors out of 16 million. Unit is also a high-quality character generator, plus digital still store—a complete station graphics package, glows and watercolors, etc. From 3M, the MFA, “big brother” to the BFA. \$50,000-\$60,000 unit displays 250,000 out of 16 million colors, with a 480 x 512 pixel resolution. Extremely fine anti-aliasing gives almost lifelike appearance. Other features will include pressure-sensitive digitizing tablet.

320.

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★
19

Di-Tech to show new Model 5850 routing switcher, with up to three levels of audio per input; maximum frame capacity 40 x 20 outputs. Di-Tech still maintaining output-oriented approach to routers claiming it's superior even though rest of industry seems headed towards input-oriented product . . . Image Video to also debut new routing switcher, using hybrid design for high density packaging . . . 3M to exhibit new two-level audio-only addition to H Series router—mono or stereo switching in 64 x 64 or 128 x 32 format. Can act as companion for video-only router.

★
20

Ultimate to introduce Newsmatte II—more automated version of Newsmatte for live weather, sportscasts, and simple production work. Also working version of Ultimate 5 seen as mockup last year.

★
21

Acrodyne to add 10 kW UHF and VHF transmitters to regular line, plus 1 kW LPTV transmitter. "All our transmitters are stereo compatible," it notes.

★
22

RF Technology making advances on 11 microwave frequencies; new 7 GHz fixed and portable power amps (-10 dBm in, 10 W out); RF-UMLD new emergency restoration transportable system, 1.9-13.25 GHz; new ENG antenna system for offering 21 dB boost.

★
23

Telex will show new handheld and lavalier condenser mics, plus lightweight, on-air quality headset/mic combinations, and new wireless mics . . . Beyer Dynamic to unveil HM-560 headset with ribbon cartridge mic, also available as M-560 mic on a boom for use as a headphone ribbon mic combination with DT-100 and 102 . . . RF Technology will join ranks of RF mic manufacturers with new 950 MHz wireless mic . . . Cetec Vega to feature two handheld RF mics, the T-84 with a Beyer 500 ribbon element, and the T-87, with a Shure SM87 condenser element . . . Crown introducing PCC-160 phase coherent cardioid mic, surface mounted. Plus new Micro-Tech 1000 W stereo power amp, miniaturized, for sound reinforcement and studio monitoring.

★
24

Expect exciting new editing concept from BTX—the Shadowmaster audio editor based on the IBM PC. Features color display of transport status and an edit sequence list for four transports via BTX Shadow synchronizer. Lots and lots of features normally found only with video editor, including built-in SMPTE calculator.

★
25

Omicron to introduce the 516 production switcher, with digital pattern generator, maximum of 36 inputs, and a serial interface.

★
26

ISC to top 1984-introduced System 51 editor with System 61: expanded RS-422 control capabilities; area of edit decision list interchange, and other features for simplifying editing. Older ISC systems will be upgradable to the 61. Also to be announced are new RS-422 direct control interfaces and advances in the Super Edit program.

★
27

Microdyne will show new SCPC demodulator with access to all channels and formats. PCDR demodulates and processes 70MHz IF signal used for most state and national satellite signals.

★
28

Centro to display new concept in ENG vehicles: capable of light production work in addition to full ENG capabilities (i.e., power, microwave, etc.). Concept generated by NBC's west coast operation, which now has two new trucks . . . Roscor will display 45-foot mobile unit built for Clearwater Teleproductions of Dallas—on the floor.

★
29

A source close to the company hints Canon will have two new products at NAB . . . Angenieux will probably also have new lens in prototype . . . EEV will introduce P 8474 ⅓-inch mixed filled Leddicons for ENG cameras such as Sony BVP 30 and 360 cameras. Also the P 8164 ⅓-inch hybrid Leddicons for cameras such as JVC KY-320E and Hitachi FP 22 . . . From Amperex, a

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★
30

JVC hinting it may just possibly introduce a new U-matic VCR. Otherwise will generally emphasize its U-Matic format line.

★
31

Accu-Weather will add news and sports graphics to its package. Will also offer its graphics on Zephyr satellite Environmental Satellite Data will premiere Color Connection—\$22,000 "complete weather graphics and data service" based around IBM PC. Major portion of system first shown at '84 RTNDA, with digitizer package and paint system new for NAB Kavouras will have enhancements for Triton doppler radar system: animation, detailed satellite imagery, and 256-color video digitizer.

★
32

Marti to introduce AR-10 mobile repeat receiver (VHF or UHF), CR-10 receiver (a rack-mount RPU receiver), and a 1.7 GHz STL for Canada.

★
33

Schafer World Communications (formerly Cetec Broadcast) will show new Ready Spot multicart cart machine with 30 trays, removable for easy maintenance 3M/ITC Omega NAB cart machine now in production models—mono playback and record, and stereo playback. Features secondary cue tone.

★
34

Continued advances on Lister Scriptwriter prompting/script prep system, now with modem capability so one user can communicate with another, plus increased storage on dual floppy-disk system Christie's CASP (battery charger, analyzer, sequencer, power supply) to make NAB debut. Product automatically senses what kind of batteries are connected to it, then sequentially charges up to six automatically—"any brand of any type, including those which haven't been invented yet."

★
35

Total Spectrum Manufacturing will introduce the VHS-100P—servo-controlled pan and tilt system, with microprocessor control and up to 100 position preset, H and V motion simultaneously; reset accuracy of .02 degrees.

★
36

On-air automation will be major item of concern at NAB, with both Sony and Panasonic continuing their push with MERPS systems. Following close of NAB, Sony inviting engineers to a technical seminar on host computer interface protocol and playlist disk format to examine connection of the Betacart to an external computer system for MC automation or to enable off-line preparation of playlist data. To register, call Ray Baldock, (201) 833-5265 Lake to feature completely automated music video UHF station—virtually completely talent-run, including studio camera Broadcast Systems Inc. continuing to make advances with DC Series 8P eight- and 10-deck automation systems, based on Betacam for U-matic decks. DC-10 priced under \$190,000.

★
37

RTS to debut Model 848 dedicated line intercom master station which can select one or any combination of 24 other 848 intercom stations Clear-Com promoting new features on DLC Series intercom: IFB, and split feed for sports.

Also production versions of CP-300 belt pack, and TW-12 interface between RTS and Clear-Com systems allowing two channels on a single mic cable Motorola C&E will have new PRX-1000 portable synthesized repeater: 48 channels, 35 W, weight about 25 lbs.

★
38

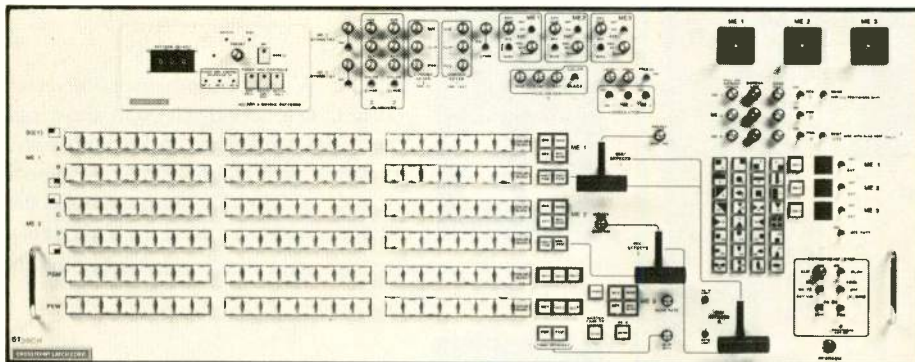
Leader to introduce LCG-420 sync test generator. Also introducing the LBO-5825 digital storage oscilloscope, especially useful for editor maintenance Rohde & Schwarz to bring new video analyzer, UVF—lightweight, portable insertion signal measurement set measuring 16 test line parameters with high resolution LED bar display Videotek will have a new sync generator. **BM/E**

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Studio Cameras: Focus on the Future

With studio cameras now so reliable, stable, and automatic, has the technology reached the pinnacle of its development? Or will the next generation bring a new breed of cameras?

By Eva J. Blinder
Senior Editor

Compared with its early ancestors from the 1940s and '50s, the modern television studio camera is a sleek, streamlined thoroughbred, replete with zoom lenses, microprocessors, miniaturized electronics, and all those labor-saving automatics. It takes far less time to set up and maintain and, when properly adjusted, makes beautiful pictures. In many respects, it seems that the technology has nearly reached its outer limits, with perhaps some minor tweaking but almost no radical improvements still possible. But have studio camera manufacturers in fact "gone about as far as they can go"? What improvements lie ahead for the next generation of studio cameras?

The possibility of solid-state sensors, smaller pickup tubes, greater sensitivity, more (or less) automation, computer diagnostics, all were among the themes that emerged in discussions with representatives of studio camera manufacturers. While each manufacturer has different priorities and a different perspective, all agreed on one thing: today's broadcast studio camera has reached a high enough plane of development that radical improvements are unlikely, barring major technology breakthroughs (such as the development of a studio-quality solid-state pickup device). Camera makers are continuing to refine and improve their products, but in doing so, they generally are building on past achievements



The Philips LDK 6, with six microprocessors, can be equipped with either one-inch or 30 mm tubes.



Thomson CSF's TTV-1525C is the only camera equipped with a color viewfinder.

rather than breaking entirely new ground.

When the CCD?

If new ground is to be broken, however, the most likely area is image sensing. Virtually all camera manufacturers see a studio-quality CCD as a likely development; by the same token, all agree it is some years off. RCA is perhaps the most bullish on the CCD's prospects; Dick West, manager of camera product management, states what the industry already knows: "RCA as a corporation is working toward ultimately eliminating tubes and using solid-state sensors" in all its cameras, including its studio line. However, he adamantly refuses to discuss time frames. Other manufacturers suggest five years from now as possible, although one comments acidly, "For 10 years, people have been saying it's five years away."

Still, the CCD holds promise for major changes in the way studio cameras are built. Tony Delp, director of camera engineering for Hitachi, sees "a solid-state pickup with studio resolution" as a possible major link in an all-digital video system. "That one item, if it comes, will change the entire way cameras are made," he predicts. Coupled with a digital VTR, "We could have digital video from front end to back end." But a real technology breakthrough will be needed to produce a CCD of sufficient quality, he insists.

Another CCD advantage is described by Gerow (Gerry) Brill, camera prod-

uct manager at Thomson-CSF: greater sensitivity with absence of lag. "Lag is the last major picture defect that has to be overcome," Brill asserts. "Noise is good, geometry can be more than adequate, but lag is the last major impediment to a good picture." There are two possible avenues for improvement, he suggests: either tube manufacturers can come up with a way to reduce lag, or a studio-quality CCD can be developed. Brill can't comment on whether Thomson is working on a studio CCD at this point, but will say Thomson has the capability to do so. Al Kiel, manager of broadcast products for Philips, on the other hand, states openly that his company is working on a CCD camera, although its first introduction will probably be an ENG-style model.

How would the CCD change the studio camera? RCA's West commented, "Some changes will be rather subtle. There'll be no overwhelming change in operation." CCD studio cameras, he said, will derive some inherent benefits from the solid-state sensors: no registration (or automatic registration circuitry), no geometry circuitry. Other inherent advantages, according to West, would be "much better resolution and certainly much better dynamic resolution, fewer problems with worrying about scene content, reflections and shiny stuff and lights in a set, and no lag, comet-tailing, burn. Auto setup would change somewhat—centering, beam, registration controls all would disappear."

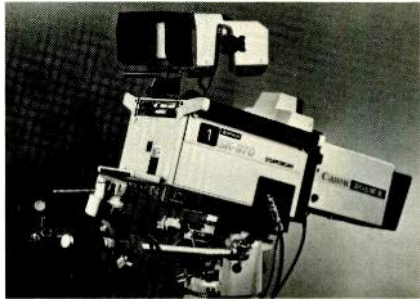
The technology needed to produce a

successful and economical studio-quality CCD is still in the future, however, and manufacturing problems have some observers worried. Thomson's Brill suggests that one area of concern is a use for rejected chips. "To be successful in the future, a manufacturer must be associated with a consumer line," he states. "You need a vehicle for the rejected pickups because the yield for CCDs is so bad." In addition, he notes, "People with direct access [to solid-state sensors] will have a financial and distribution advantage."

Some of his concerns are echoed by Ikegami's vice president of broadcast products, Herman Skolnick. He says, "The wave of the future would be a solid-state pickup, but it must have the performance desired and required by broadcasters. The problem is that the development of this device has been slow, not in terms of making one or two but in terms of making a sufficient quantity at a reasonable price. . . . It's going to happen, but the real question is when." He notes that while Ikegami is keeping abreast of CCD developments, the company lacks the semiconductor capability of some of its larger competitors, who can build their own pickups in-house.

Shrinking tubes

While a CCD with studio-quality resolution is still out of grasp, current developments in tube technology are already challenging the domination of large-format tubes for studio cameras.



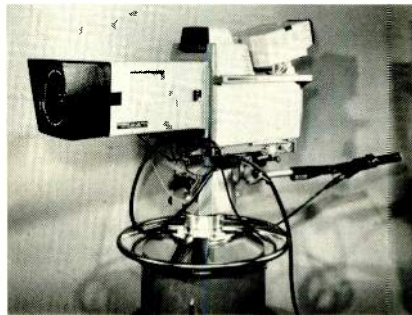
Hitachi's SK-970 is a full-featured 2/3-inch studio camera.

Hitachi's SK-970, Philips's LDK 26, Ikegami's HK-302, and Sony's BVP-360 all incorporate 2/3-inch tubes in a studio or studio/field configuration. (Ikegami recently introduced another new 2/3-inch studio camera, the SC-500, intended primarily for industrial applications.) Although these cameras generally have a lower degree of computerization than their large-format counterparts, they nevertheless include a wide variety of automatic functions. (The HK-302 is the only manual setup camera in the group.) Says RCA's West, "In all honesty, I think the large studio cameras with 30 mm tubes are getting stronger and stronger competition from 2/3-inch cameras. Ultimately, the market for large-tube-type cameras is shrinking. Two-thirds-inch tube technology is putting out pictures that may not be quite as good, but are perfectly adequate for most applications I think that breed of camera is in great jeopardy from two fronts: the 2/3-inch tube challenge and, ultimately, the CCD challenge."

According to Thomson's Brill, this shift to smaller tubes has proceeded more rapidly in Europe than here. "Europe has been one-inch oriented for some time," he comments. "The U.S., which was always 30 mm oriented, went through one-inch very quickly and is now moving to 2/3-inch tubes." (Thomson's TTV 1525C has one-inch tubes.) Brill believes one of the reasons for the slow acceptance of 2/3-inch cameras has been the lack of good quality studio lenses for them, which Canon and Fujinon are now remediating. At last year's NAB, for example, Canon introduced a 40X lens for the BVP-360. Fujinon has also shown a 44X lens for 2/3-inch cameras.

With all their improvements, however, the tubes still have problems. Some see the new mixed-field 2/3-inch tubes as an important breakthrough that will bring better registration and as a result, higher resolution. "They're going

to be a major change for the industry," says Delp. He and some others, however, note that stern wave may be more pronounced in the mixed-field tubes, which combine magnetic and electrostatic control. This illustrates the tradeoffs involved in almost all technology upgrades; improving one parameter often makes a second parameter worse. Brill notes another tradeoff that he says has affected 2/3-inch tubes: lag versus resolution. "We're still operating with Plumbicons and Saticons that have lag," he states. "Two-thirds-inch tubes have better lag, but in order to get better resolution tube manufacturers have made



The HK-322 is Ikegami's top-of-the-line studio camera.

tradeoffs in target material," limiting the lag performance. So actual lag in 2/3-inch tubes is probably no better than in 30 or 25 mm tubes, according to Brill.

Another area for performance improvements in tubes is comet-tailing. Philips has built a tube with a special anti-comet tail gun structure for outdoor work for the past 15 years and is now producing a second-generation model. According to Kiel, the advantage of the various anti-comet tailing circuits designed to work with diode gun tubes is that "you have to get into a problem before you take corrective measures;" i.e., they are feed-forward systems. Because the ACT tube works during retrace with a defocused beam, it has 30 lines of "foresight" that allow it to work on beam bending and problems associated with blooming. Philips has supplied 90 percent of its LDK 6s with these tubes.

Sensitivity

Another well-known camera tradeoff is sensitivity versus noise. Harris's manager of distributor sales, Ron Frillman, sees cameras becoming more sensitive, partly in response to stations wanting to use less light because of energy costs. Kiel feels sensi-

tivity is one of the largest issues in studio cameras today. "I still feel there's a broad gap between ideal sensitivity and what any camera offers," he comments. "They don't compete with the human eye yet, and I would think we'd want them to do that." According to Kiel, Philips has dabbled with image intensifiers (light amplifiers, used in industrial surveillance cameras) as a means to increase camera sensitivity. At one point in the 1970s, he says, Philips introduced a broadcast camera using image intensifiers. However, tradeoffs, mostly in the areas of graininess and noise, interfered with the camera's acceptance, and it was discontinued. "I think with the CCD on the horizon many of these other [sensitivity-increasing] possibilities are no longer being pursued," Kiel adds.

Blue-sky ideas aside, sensitivity is less of an issue in a studio situation than in the field, according to Brill. "In the studio, people don't worry so much" about sensitivity because it's easy to light sufficiently, he says. The real sensitivity problems occur in stadiums or at late-afternoon golf tournaments. "Even more important to me is lag. If you take an ENG camera and increase the gain by 18 dB, you get a fairly respectable picture—but if you pan the camera, you get a lot of lag."

"Camera sensitivity is really lens and tube sensitivity—it really has nothing to do with the camera manufacturer," adds Delp, who feels CCDs will make a major difference in camera sensitivity. "The CCD has such tremendous signal-to-noise that they can increase the sensitivity of the pickup," he suggests. "With the CCD it's up around 64 dB, so you can lose three or four [dB] and still be up around 60, and gain an f-stop."

Within the camera itself, some sensitivity gains are being made. Sony's BVP-360, for example, incorporates Canon's new f/1.2 prism, the first camera to do so. (A full description of the f/1.2 prism appears in this issue on pg. 79.) According to Jerry Cohen, product manager for the BVP-360, the new prism gives the camera virtually the same sensitivity and depth of field as large format cameras. Combined with the better depth of modulation—and hence, better resolution—of the mixed-field tubes, the new prism narrows the gap between large-format cameras and their smaller-format competitors.

Another area where smaller tubes may bring about change is in the quest

for a truly convertible camera, equally at home in the field and in the studio. West, for one, sees convertibility as a trend. "It's really been brought on by the performance of $\frac{2}{3}$ -inch or mixed field tubes moving into studio quality and leading to smaller cameras," he suggests. "In the future you won't have the big behemoths like the TK-48 or LDK 6. Instead, we'll have smaller camera heads." With the smaller heads, power supplies, also, can be smaller. "The trend to smaller, more mobile, more flexibly portable heads will continue," he concludes.

Philips is also interested in a convertible camera. Says Kiel, "We continue to think about ideas of convertibility—one camera that can do it all." Smaller tubes or CCDs will greatly increase the possibility of a convertible camera that will fulfill a variety of needs, he feels. In addition, he notes, Philips has been working with miniaturized components for a while. The problem with them is servicing: their tiny size makes them difficult to work with. One idea might be to group them together "into one package that's large enough to get your finger on," in Kiel's words. "We are highly motivated to make a universal camera if we think we can satisfy enough people with it."

Better registration?

Thanks to modern, stable circuitry, registration errors are no longer the serious concern they once were to broadcasters. As one expert put it, "If you've got a color fringing problem, you've got a *horrible* camera." But short of perfection, there's always room for improvement, and camera manufacturers have been working hard to refine their registration capabilities. A particular focus for R&D has been chromatic aberrations in the lens. Because different colors of light move at different frequencies, they have different characteristics when passing through a lens. This is especially noticeable with some of the higher frequencies of light. Because of these chromatic aberrations, zooming the lens causes slight changes in registration.

To correct for these, manufacturers are turning to microcomputers. A good example is the dynamic lens correction, programmable by individual camera and lens, that RCA has incorporated in its latest studio camera, the TK-48. Using an external diascope, the operator zooms the lens to any three points in the range, setting it up and storing the information at each point. An algo-



Sony's BVP-360 is the first camera to incorporate Canon's f/1.2 prism.

rithm in the camera's microcomputer then assumes the lens is linear between the stored points and extrapolates for points in between to dynamically correct for chromatic aberrations. Sony also uses a dynamic correction system in its BVP-360, which Cohen says has more extensive lens files than any other camera. The camera stores zoom and focus information for five different positions of each of 16 lenses, correcting dynamically during use.

Hitachi is also using microcomputers to correct for chromatic aberrations. A particularly refined system is incorporated into the company's new HDTV camera, which incorporates a specially built Canon lens with its own microprocessor system and ROM capabilities. The lens sends data on focus, zoom, and f-stop to the digital scan registration system in the camera for continuous, total correction. Hitachi's most advanced studio camera, the SK-110D, also incorporates this digital scan system. Delp suggests that another important area for registration control is monitoring the temperature of the camera prism since heat generated by the lens can cause registration changes in the prism and tube assembly.

How much better can registration get? Opinions differ over how much change is possible, or even desirable. Thomson's Brill says, "Going beyond where we are in registration method would be a point of diminishing returns" because of the high degree of accuracy now achieved. As he puts it, "Point of five's awful hard to measure." The cost of in-lens computers

may outweigh their actual benefits, he suggests.

"An in-lens microprocessor may be more important in HDTV than in 525-line television," Brill explains. "In a 525-line system, you can tolerate some error in registration and not see a loss in quality on a standard home receiver. But in high-definition TV a sharp monochrome picture is even more critical. I think it's probably a little bit 'frosting on the cake' for standard television, but it's mandatory for HDTV." Now, some lens errors can be compensated for with the registration controls needed anyway for the pickup tubes. "Until HDTV reared its head, [the in-lens microprocessor] was nice but it wasn't necessary. But with high-definition, it'll be mandatory."

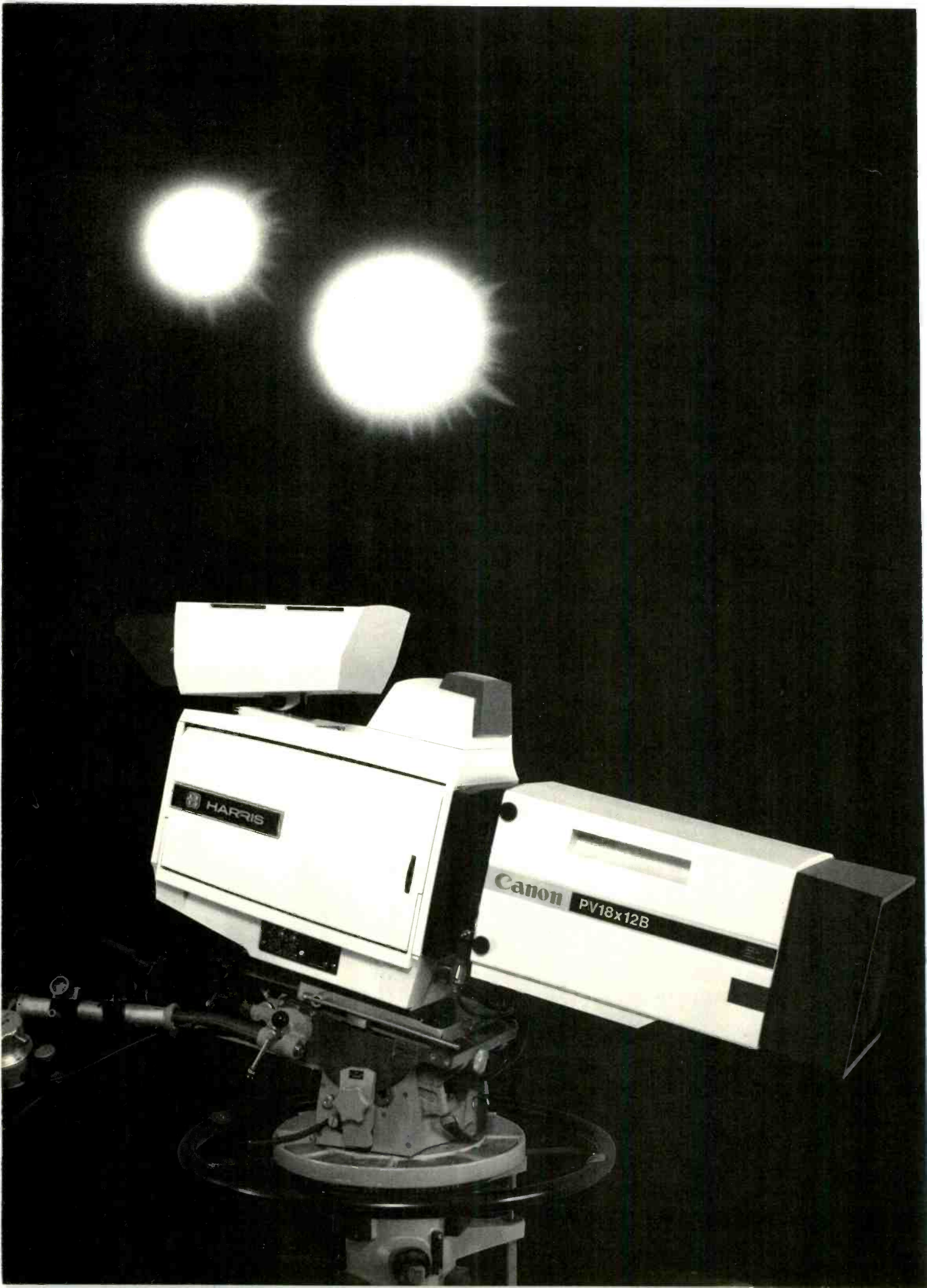
While agreeing that today's cameras have very accurate registration, Delp still stands behind the fine-tuning. The digital scan registration system, he says, is "not so outlandish, it's just expensive." He continues, "Registration errors have gotten to the place where they're not really a problem the way they used to be. . . . Hitachi is working very much in depth on registration errors. We'll see [changes] in the next year or two."

In a related area, some manufacturers are looking toward changing contouring controls. In general, cameras contour out of the green channel, and most manufacturers find that method satisfactory. Harris, on the other hand, recently patented a circuit to contour out of green and red simultaneously, which Frillman says results in a sharper-edged, more realistic picture. Thomson's Brill predicts that CCDs may change the way contouring is done. "As CCDs become more available, they can be used as delay elements," he suggests. "I see the day coming where you'll have contours out of each individual channel."

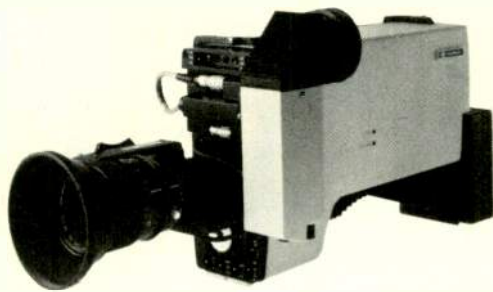
One development that may not be in the cards is the color viewfinder. While Brill "would be happy to see improvement" in small color CRTs, he complains that at the present time they lack the resolution a camera operator requires. Delp echoes Brill's concerns, arguing that a color viewfinder probably won't be much of an advantage. "It becomes heavy, big, expensive, and a maintenance problem—something else that has to be fixed," he states.

It's automatic

What does the future hold for computer-controlled automatic func-



Which camera company offers a unique new process that sharpens your image without dulling the colors?



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Weighing about 8 pounds, the TC-90 is one of the smallest. But we deliberately made it a little bit bigger than it had to be to add balance and stability. A little longer to let the cameraperson grasp the lens in a natural, comfortable, controlled way. And we carefully shifted extra weight to the tail, so that the weight of the lens is counterbalanced.

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An impressive 48 operator func-

tions are controlled by the computer in the TC-85C, and adjusted according to preset parameters. Each camera has a built-in independent computer so that all cameras can be set up at the same time. Even by an inexperienced cameraperson. With just the touch of a button.

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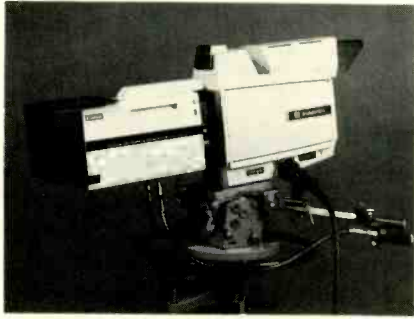
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The Harris TC-85 does contours out of red and green channels simultaneously.

tions, perhaps the most obvious difference between top-of-the-line studio cameras and their less loaded counterparts? No manufacturer contacted for this story predicted an increase in automatics, although all were confident that automatic features are desirable and necessary to the modern broadcast operation. Delp comments that automatics "make reliable, continuously repeatable results possible Almost everywhere I see [engineering] manpower shortages. Stations can no longer afford to have expensive engineers maintaining cameras." Automatic cameras, he says, save stations money and free up engineers for other work by transforming routine camera maintenance from a day-in, day-out job to something that takes only minutes.

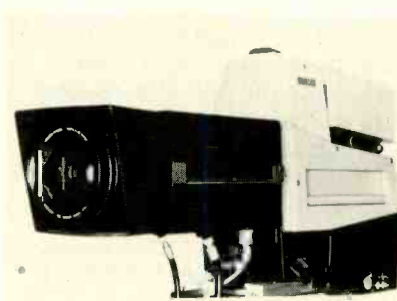
Harris's Frillman agrees. "There's a larger market now buying computer setup cameras," he says. "Now, due to economics, it's less and less feasible for an engineer to be assigned full-time to take care of cameras."

Because automatics are software functions, updating is relatively easy—but definitely not without problems. On the LDK 6, for example, Philips has provided users with several standard updates since the camera was introduced. These updates come as a set of PROMs that snap into a socket. This makes retrofitting easy for users, but Kiel emphasizes that changing software can be difficult and time-consuming. In a software-based system, changes in one parameter may cause unwanted changes in another. Making customer-requested changes, therefore, is hard programming work. In any case, radical changes are unlikely. "At this point, the refinements are just that—refinements," says Kiel.

In fact, some observers see a slight pulling away from automation, at least in some areas. According to Brill, "There's some market shift on automatics—a tendency to leave some things unautomated, rather than auto-

mating everything. Certain circuits are so stable it's almost better adjusting them once and then leaving them alone—for example, beam alignment and beam focus."

Hitachi, too, has felt that certain things shouldn't be automated—for example, tube back focus and beam setting, which have been automated by some other manufacturers. Delp emphasizes, however, "We're not decreasing automatics. Basically we're staying the same with the 110. We're adding some refinements, but we're not decreasing." Automation will continue to be needed because it cuts down on engineering time. "The networks have a tremendous number of our cameras.



The TK-48 is the recently introduced successor to RCA's highly successful TK-47.

Down time, maintenance time, setup time has fallen to almost nothing because of automation," Delp claims. "You're going to see automatics in cameras up until the time we develop a solid-state pickup. They make a lot of things easy to do that would be difficult otherwise"—control at an RCU, for example.

Blue skies

Computers, of course, have already transformed cameras, as they have almost all aspects of broadcasting. Their powers continue to intrigue camera makers. Frillman, for instance, has an admittedly blue-sky idea that could revolutionize camera maintenance. He suggests linking the camera's internal computer by modem to a larger mainframe computer with much greater diagnostic capabilities, located at the manufacturer's headquarters. In this way, users could perform very specific preventive maintenance over the telephone in just a few minutes. Besides cutting down on engineers' work, such a system would eliminate the need to stock tubes and other parts. (Frillman notes that this is his own idea and that

Harris is not working on such a scheme at this time.)

In a different vein, Delp suggests that the lowly camera cable may be in line for rethinking. "Probably the biggest thing that's coming is a change to fiberoptic camera cables," he predicts. According to Delp, the biggest problem with fiberoptics will be connectors. "For fiberoptics, the butting of joints must be so perfect that today it's impossible in any kind of field condition with mud and dirt." Connections must be very precise and clean. Also, he notes, fiberoptic cable "is small but fragile. It doesn't bend real well." Another problem will probably be getting enough power to the camera through the cable. Small cameras for ENG/EFP can be battery powered, but studio cameras need mains power." Still, Delp says, "We'll probably see it within the next five years without difficulty. It seems to be something that's feasible."

Next generation

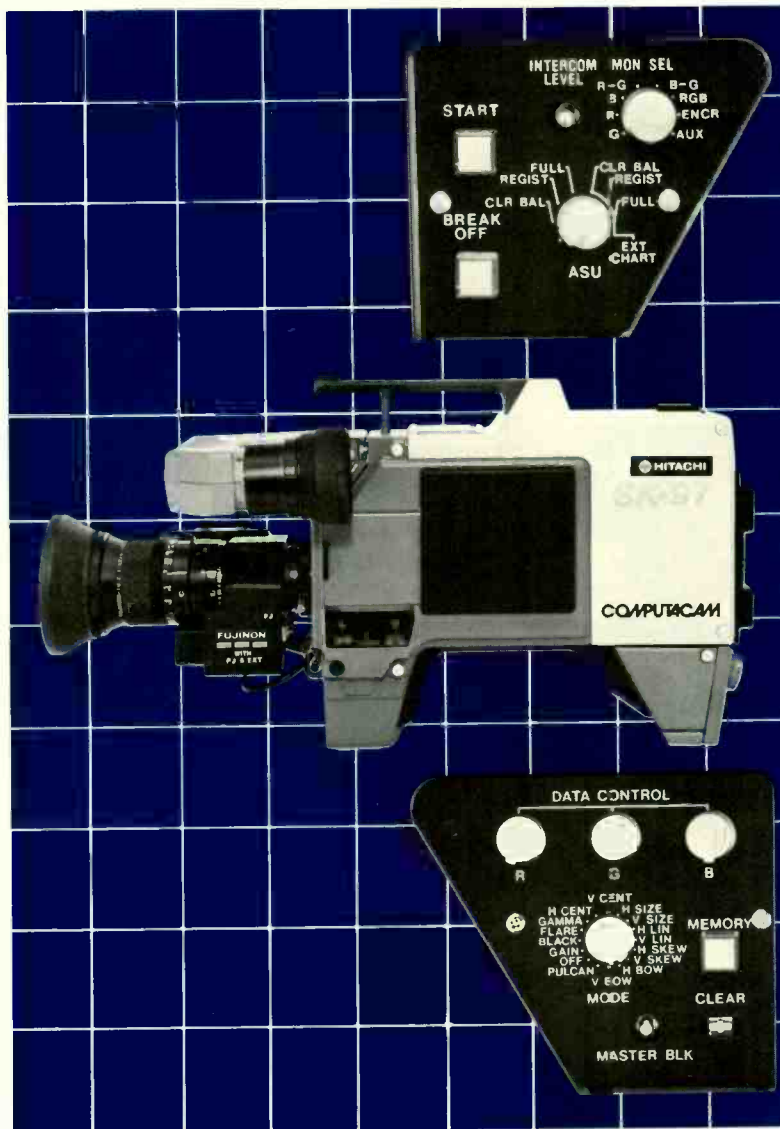
Despite the various blue-sky schemes, the next generation of studio cameras will probably be very like its predecessors—only a little better. Thomson's Brill feels the changes in the next generation will be "more into component reliability than performance. The camera industry has a pretty reliable and stable product now. If we could insure ourselves of increased stability, we could decrease automatics." The tube assembly, after all, "definitely has stability problems. Look at the specifications on any camera. Depending on the individual manufacturer, they usually specify a range of plus or minus 10 degrees Celsius from the setup point. All manufacturers tie themselves down to a fairly narrow temperature range because of variations in the pickup device."

Sony's Cohen also sees the likely changes as relating to daily use. The operational aspects of cameras will probably receive most attention, he says: "The in-use functions and facilities are more closely being addressed now than some technological breakthrough." He also sees a move to decentralized computer control. **BM/E**

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TECHNOLOGY

Optimizing Profitability with Information Management

A management information system can harness the power of a computer to boost station profits. Don't let common pitfalls decrease the utility of your computer.

By Bryan D. Boyle
Contributing Editor

Picture this scenario: you are the GM of a group-owned station. Your sales have been increasing, as has your share since the last book. Corporate is very pleased with the past quarter's performance; projections are looking good to propel you into a record-setting year. Now the phone call: "... and I would like projections of estimated penetration in the 25-34 demographic versus sales targets and performance since the beginning of the fiscal year. . ." So, you turn to your trusty card file and begin to shuffle through the client list, tabulate their target markets, and start to compare sales performance against your book's numbers.

Three days, later, the report is finished. You have a feeling there is an easier way, but you just can't put your finger on it.

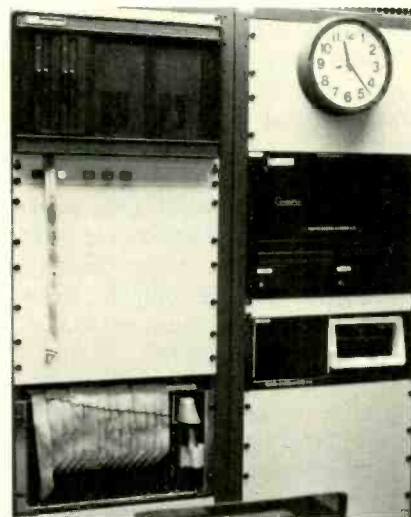
What you need is a way of comparing and retrieving information that has been assembled and quantified on an ongoing basis, and compiling that information into meaningful reports and tables that can be used to improve your

operation. In short, you need a management information system (MIS).

In its most basic form, an MIS system is used to centralize where day-to-day operating and financial data is stored. In terms of a computer system, this means that a master file of information is kept on paper, tape, disks, or some other medium and can be accessed by authorized personnel to be used as a reference in making business decisions. If you take a look at all the extra information, you can reduce it to this level. What separates one MIS implementation from another are the *relational methods* used in order to access, index, and report on that information to the user.

What information is stored? For starters, your sales and contract information, general ledger (which includes accounts payable and receivable), and perhaps, for an added incentive, your daily program schedule.

One of the most important concepts to remember when planning for an efficient MIS installation is that the information must be secure. The old saying about locking the barn door before the horse is stolen is never more appropri-



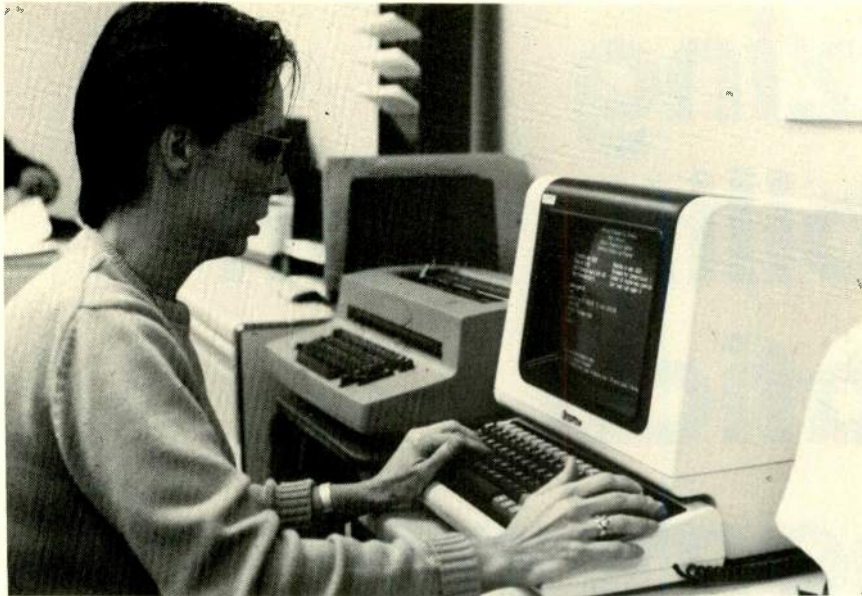
The large-scale MIS system at ABC Radio Networks is actually two systems tied together, each with its own processor and disk storage unit.

ate than when computerizing your station information. The guideline is that you should not make accessible information that is not accessible now.

With these cautions out of the way, let's think about some of the important considerations in planning for a computer system.

The first would have to be the physical location of the system. Most broadcast facilities were not designed with the idea of adding a computer system to the operation. How, therefore, do you cope with locating this new and exciting piece of equipment?

First of all, your MIS computer should be located away from the major foot traffic areas of your station. The



A data entry operator enters commercial information into the ABC MIS system.

GM's office is way down on the list of potential locations, as is the master control area. Why? Computer systems (and we're not talking about desktop units) consume a hefty amount of commercial power and, because of the noise of the various peripherals, are not well suited to being located in an office or work area. Since master control is probably staffed, the computer would not be secure in the off-hours, eliminating this location.

This is not to say that the system should be locked away in a closet, though. What you should plan for is a separate office, say about 15 by 15 feet, where you can locate the CPU, system printer, console, and media supplies. This area should have its own separate power drop from the main breaker panel and, for an added measure of protection, an uninterruptible power supply. This added measure of protection may mean the difference between an orderly shutdown of the system in the event of a power failure or a massive data reconstruction effort because of a power loss.

The second area to consider is how many people should have access to the system. Remember what I said about accessibility? Before the system is configured by the software vendor, you should sit down and look at the path the various pieces of information take in your operation. For instance, who handles the initial sales writeup? Where does it go from there? Who signs off on the order? Where is it released to traffic? In short, what is the direction of information flow, and how much information is needed by each person to

complete the task? This must be done for each intended use of the computer, whether it will be used solely for sales and traffic or be part of an integrated system encompassing the full range of the business activity of your station.

Locking up

Don't neglect to ask the computer equipment vendors what steps they have taken to insure the information isn't released to unauthorized personnel, aside from the hardware security of the system. It defeats the purpose of hardware security if the information can easily be "peeked at" by others. Some information is public, of course, but a station can be put at a competitive disadvantage if its private, sensitive information becomes common knowledge. What software protection capabilities are written into the software? Is there a multiple-entry identification and password verification process, or is the system accessible simply by turning on the terminal? Is an activity log kept so that any problems with unauthorized data access can be traced to the time and place they occurred? Are the programs secure enough so that an operator will not corrupt data unwittingly by leaving a program operating when the office is closed for the evening? All of these ideas must be addressed.

On the question of staff, one thing is often overlooked when the decision is made to install an MIS system: who will be responsible for the maintenance (cleaning the floppy disk heads, etc.) of the system? Who will insert the pro-

gram "patches" that seem to crop up from time to time, and make sure the programs and data are maintained efficiently? For most operations, the necessary tasks do not require a full-time staff person and can be added on to the duties of an existing employee. You should select one person that can understand the concepts of computer operations and make that person responsible for the proper operation of the system on an ongoing basis, providing him or her the opportunity to obtain training on your particular system.

Training tips

There's another big question you should bring up with the vendor: training. Computers are fast, they are certainly expensive, and they can help you increase the productivity of the whole operation. But, first and foremost, they are tools, as surely as a wrench is a tool for an auto mechanic. Data processing equipment is not meant to replace people, but rather to complement and expand the productivity of your existing personnel. But just as a wrench is worthless in the hand of an inexperienced mechanic, if the people who are to use the computer in your operation are not trained in its proper use and the need for accuracy in inputting data, that computer will be worthless as a tool for your operation.

What should this training involve? First, the basics: how to turn the machine on, how to do an orderly shutdown if needed, how to perform the daily data backup, and the other day-to-day tasks. Many people are overwhelmed by computers. A good computer supplier will strive to make your staff as comfortable as possible with the physical aspects of the machine so that this first hurdle can be overcome.

Second is what I call the "first date" syndrome: How do you operate this thing? One way of judging how well a vendor has done his homework is to take a look at the input and output displays contained in the programs. Is the information clearly presented, or is a lot of extraneous information displayed with the data? Are the areas in the data file that need your attention clearly delineated, or do you have to hunt for them amidst a jumble of information on the screen? Is the information requested in some logical order? Believe it or not, some programs in the general marketplace have been known to ask for input in the order of: name, zip code, city, address, and state.

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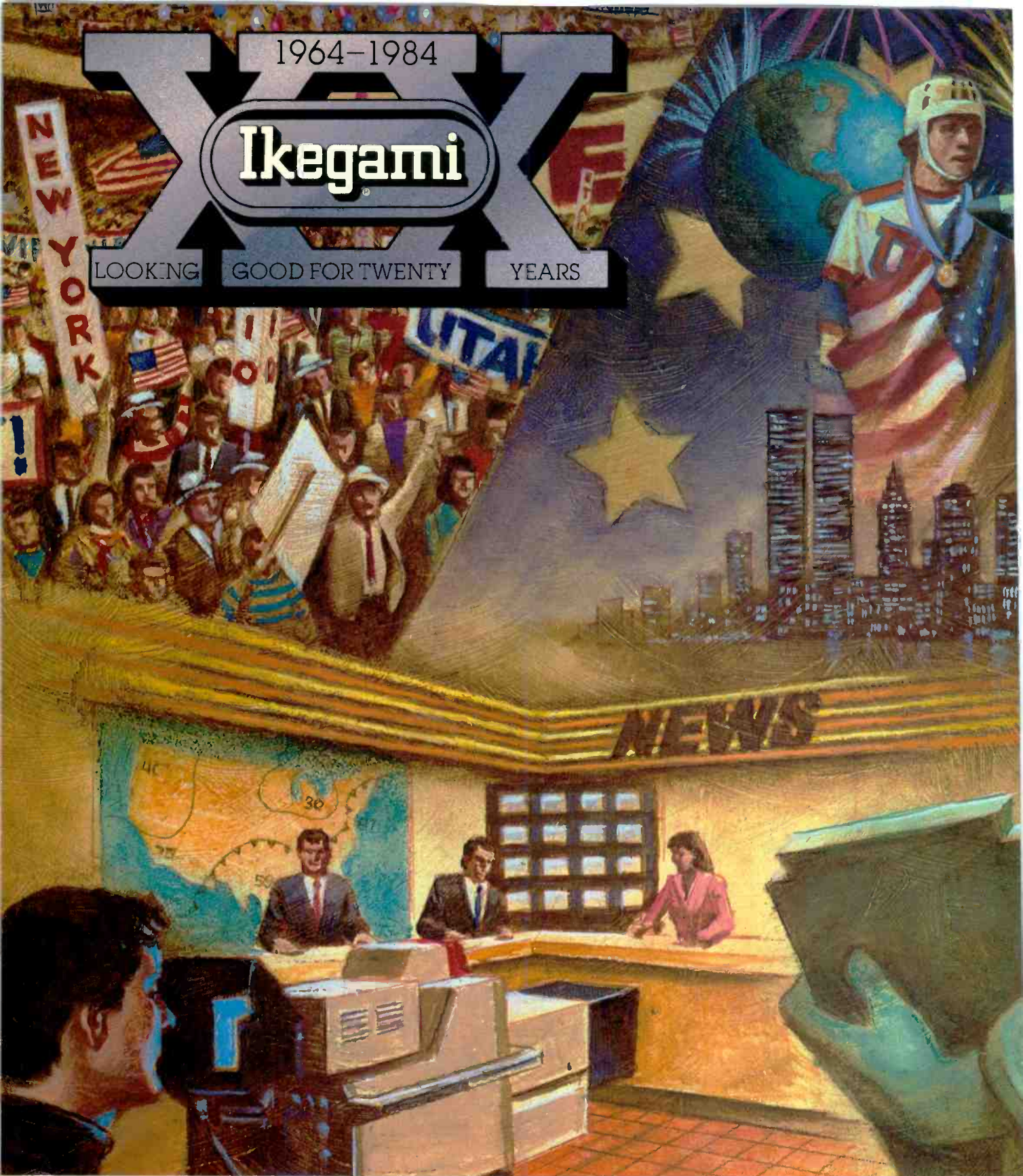
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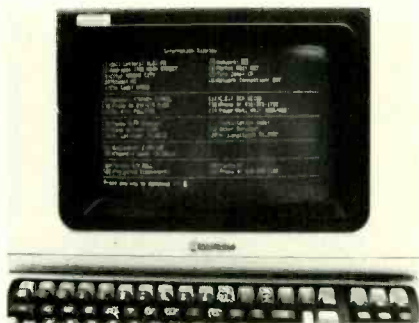
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Doesn't make much sense, and it can confuse even an experienced operator.

If the software is properly programmed for your operation, apprehension will soon give way to confidence on the part of your staff, once they see how the system operates. Your capital investment makes this machine an important piece of equipment for your station and as such it will become a central tool for planning and administration. Because it is so important, the software should be easy to understand and logical to use so that operating it is not an onerous task, but something the operator looks forward to doing.

Go custom

Much of the information we have to deal with as broadcasters is unique to this business. It may be possible to use some canned software such as DBase II (from Ashton-Tate) or Lotus 1-2-3 (from Lotus) on an IBM PC or compatible machine to do most of what you want to do, as long as you understand the limitations of the software. However, it is hard for a software author to know all the applications a program will be put to. Software is most often written to follow the middle path:



The system allows ABC to file and call up at will a variety of information on affiliates.

enough detail and manipulative abilities to be useful to a large number of people, but not specific enough to solve the problems of every business. Unless you are a small operation and really do not need to handle massive amounts of data, I would suggest going for the purpose-built systems that are available.

A few manufacturers produce purpose-written software for the broadcast industry, usually designed for a specific computer. They range from the small, single-user system to the minicomputer realm.

For the small-market radio station, a group called The Management in

Aledo, TX, has a comprehensive package of software that helps you keep track of your sales inventory, logging, and monthly billing/affidavit requirements. The company started on some of the early eight-bit systems, and as of the last NAB was writing and delivering systems specifically for a whole range of small computers. Such systems can be used effectively by the station management that doesn't want to make the large investment necessary to bring a minicomputer into the operation. If you are willing to sacrifice some speed, it can fit the bill quite nicely.

Such manufacturers as Kaman Sciences or Columbine combine minicomputer hardware such as Wang or IBM with custom software and sell complete systems for the medium to large market station. The advantage here is that, despite the hefty investment (which you can depreciate, by the way), these systems can do for your operation what it would take a platoon of office staff to accomplish. Typically, these systems handle complete sales entry routines and availability databases, produce hard-copy logs for multiple stations (insuring that competing products are not run in clus-

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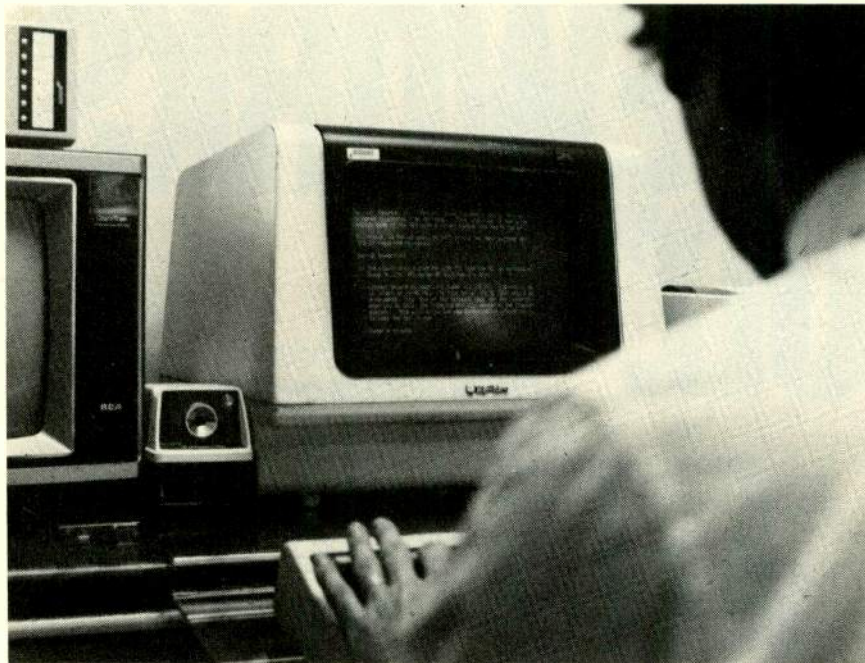
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In addition to data processing, the ABC system has word processing capabilities. Here, a management employee writes a memo.

ters), and generally are programmed to automate, as much as possible, the business aspects of your station. Since these programs are written specifically for broadcasters, you don't have to

make the compromises necessary when using off-the-shelf software, nor do you have to spend an inordinate amount of time explaining to a computer salesman what it is you are trying to do.

Because of the enormous flexibility of such systems, added improvements can include word processing, full audit-trail of the station's business activity, and even entry into automated program operations, with report-back capabilities from programming as to the real times spots ran and programs began and ended. Closed-loop systems are being worked on now, and the potential to maintain control over the total flow of the station's product means the accountability problems inherent in broadcasting can finally be brought under control. Affordable systems such as this are not far off, and when they arrive they will serve to make your station even more competitive.

Bringing an MIS system into your station is one of the most important decisions you will have to make as a manager today. Careful study of what you are doing now and where you would want to be with the installation of such a system will pay dividends in increased efficiency and decreased losses because you don't have the information you need when you need it. Plan carefully, and you will wonder how you managed to get along without it!

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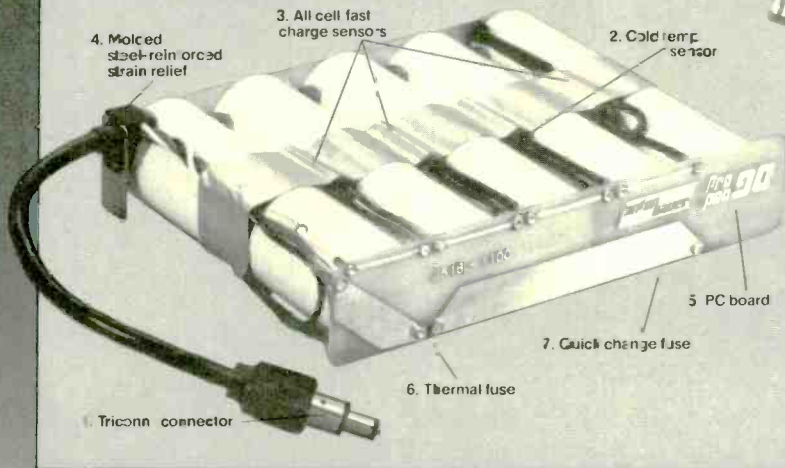
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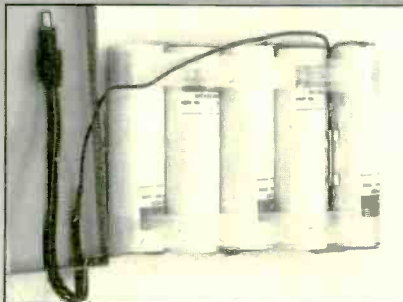
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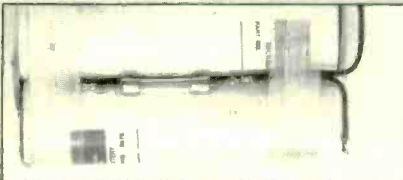
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Monitoring Technology Aids Remote Control

Thanks to new automated monitoring techniques, large remotely controlled networks can proceed with safety.

By Larry Evans

The Nebraska Educational Television Commission operates nine television transmitters (six full-power VHF and three high-power UHF) which are located throughout the state. These transmitters, in conjunction with 16 translators which range from 1 W to 1 kW, provide Nebraska with nearly complete coverage and 112 broadcast hours per week.

There were many incentives to remotely control one or more of the VHF transmitters. In the case of KRNE-TV (Ch. 12), located in the north central region of Nebraska, the benefits for remote control, as well as the technical complications, were obvious from the beginning.

KRNE is located 17 miles south of its city of license, Merriman, which has a population of 150—a density of about one person per square mile. This transmitter, located in the rugged and harsh Sandhills Region, has had an historically high turnover of personnel. If remote control could be achieved, then the operation staff needed at KRNE could be reduced from four to two. The two excess staff positions could then be transferred to the main studios in Lincoln, where the manpower was badly needed. This reduction of high personnel turnover costs at the site would be an additional benefit to the station.

One of the technical complications of remote control which KRNE would have to overcome was its adjacency to KTNE-TV. KTNE-TV (Ch. 13) is KRNE's nearest potential control point. Located 90 miles away, and on



The antenna at KRNE-TV, near Merriman NE, is 1029 feet high.

the adjacent channel, KTNE would seemingly pose problems in the form of cochannel interference. Since VHF is much more subject to cochannel interference, the combination of KRNE's Channel 12 and KTNE's Channel 13 virtually eliminated any hopes of off-air monitoring of the KRNE signal.

Monitoring solution

The solution to the off-air monitoring problem appeared to be the Tektronix 1980 ANSWER (Automatic Video Measuring Set). It was felt that KRNE could be remote controlled and monitored by multiplexing the serial data from ANSWER with the serial

data from a state of the art remote control system over a full duplex dedicated line. With this concept in mind, a 1980 ANSWER was purchased, along with a Moseley MRC-1A. Both systems were ordered with RS-232C interfaces for input to a data multiplexer. After separate familiarization with each of the systems, it was time to attempt to multiplex the two data streams.

The initial concept was to implement a statistical multiplexer because of its more efficient use of available baud rates. Advice and the loan of equipment from the local telco aided in the selection of what was going to be needed for the final system. Statistical muxes and modems were then lashed together and calculated losses were made, but the system refused to function.

After carefully studying the system, several discoveries were made—cable compatibilities, data configurations such as word length, start and stop bits, and priority. It was felt that what was happening was the lack of a priority designation for the Moseley information. Every 250 milliseconds the Moseley control terminal tries to talk to something. If no response is received within two seconds, the control terminal decides it is no longer connected to anything, and activates the failsafe system. While the Moseley interrogate word was waiting in buffer to be read out, the ANSWER was busy reporting or graphing, claiming all the transmit time from the multiplexer.

It was decided to try some time division multiplexers in hopes of eliminating the buffer delay problem. Arrangements were completed to test



An operational ANSWER system at the Atlanta transmitter site near Lexington, NE. Shown from left to right are the Tektronix 4006 Computer Display Terminal, 4631 Hard Copy Unit, and the ANSWER Unit.

some TDMs, which proved quite successful after some minor problems were solved in setting them up. The final configuration had both inputs operating at 1200 baud asynchronous and 2400 baud, 3002C unweighted line which had been ordered between the two stations. This configuration gave adequate time for the measuring system to provide its reports and for the remote control to interchange its "hand-shaking" and data transfer messages.

The equipment was then dismantled and taken to KRNE for installation. After being installed, the whole system was again operated back-to-back at KRNE for checkout and personnel familiarization with the system's capabilities. The initial expectations were for the personnel at the controlling point, KTNE, to be able to work with the measurement and control system in this back-to-back configuration to give them a better mental picture of what was happening at the transmitter while they were in control. Although these were good intentions, there was a lot of pressure to get the system operational because of the turnover in manpower at KRNE.

Telco problems

On January 15, 1982, three months from the original startup date, the control line was scheduled to be turned up. Less than a week later the control end equipment was removed from KRNE

and transferred to KTNE during a blizzard. High data error rates had made the system unusable for both control and monitoring. At times, control of ANSWER and the Moseley remote terminal was lost.

It appeared that the problem was that different manufacturers' modems were on the lines, and telco couldn't get them configured to talk to each other. Most

of the telco problems were solved, however, when modems of like manufacture were installed.

With a usable link between the two stations, a period of dual control began on February 19. This consisted of personnel at KTNE operating the KRNE transmitter by remote control while operators at KRNE watched for potential problems and provided corroboration of measurements made at KTNE. The KTNE operators were not looking at a picture or waveform monitor. Instead, they evaluated the status of KRNE from alpha/numerics supplied by the Moseley control terminal and the Tektronix terminal CRT. If additional information was needed to satisfy a particular question, the graphics capability of ANSWER was called upon to provide the necessary information.

Audio modulation

Now that problems in remote control and measuring the video signal had been covered, the audio problems had to be dealt with.

Since no useful off-air signal was available, a simple modulation monitor could not be used. The solution was to connect the output from the rear connector JX of a TFT 702 to the Moseley status input, which provided an indication that positive modulation peaks were exceeding 100 percent. The peak flasher threshold and driver circuitry was duplicated on a board compatible with the TFT mainframe, and a socket



Larry Evans (center) meets with Bill Clark (left), transmitter supervisor, and Larry Hanson, transmitter engineer, at KTNE-TV site in Angora, NE.

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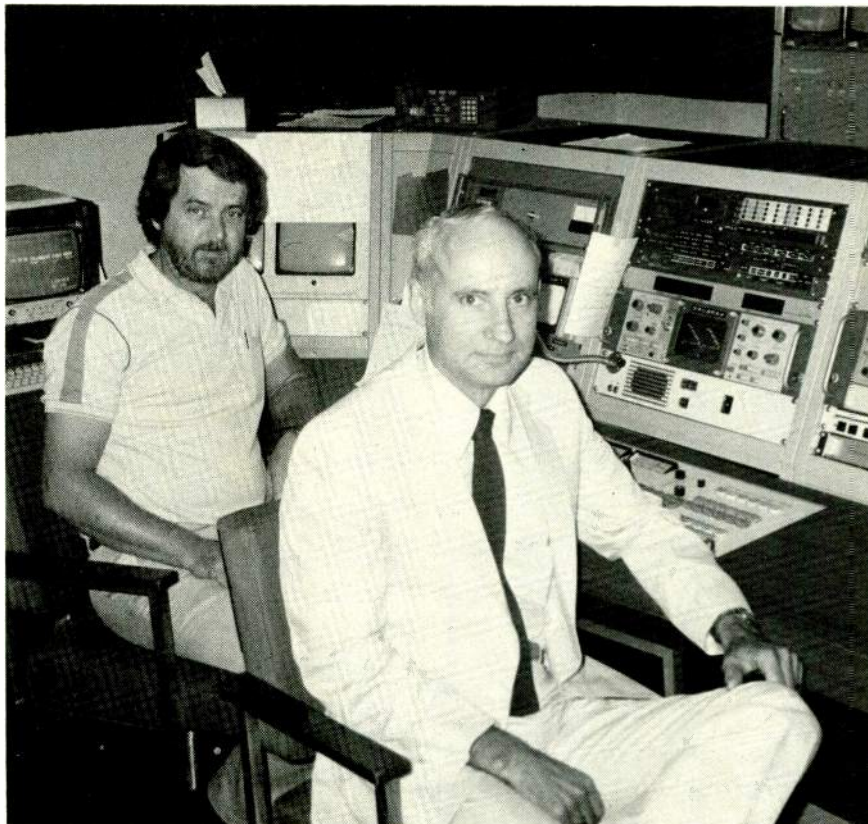
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Larry Evans (left) and Bill Ramsay, director of engineering, Nebraska ETV, in one of the control rooms at the main facility in Lincoln.

was wired to provide power and input/output signals. The output signals, connected via an added connector to the status inputs on the Moseley, were then adjusted to fire at 25, 50, 85, and 100 percent modulation levels. The sample and hold circuitry prevented a true sense of program dynamics on the status LEDs, but provided a positive indication of the audio modulation levels of the transmitter.

To provide verbal communication between the sites, a black box was installed. This also allowed station personnel at either end to break the control line. In addition, the black box served to switch the audio output of the TFT to the control lines via Moseley control. In this way, operators at the control point were able to monitor the transmitter audio. A timing circuit restored the control line to normal in 20 seconds, since once the switch to audio monitoring was made, the line to the remote control was broken. Using the system in this manner, operators were able to verify correct audio.

Measurement systems

Initially, operation of the ANSWER was through the "monitor and report" program of the Option 01 software. The primary weakness of the Option 01

software in transmitter monitoring was its lack of a zero carrier reference. The Tektronix Option 03 program solved this problem. By the time the program was installed in September, KTNE operators had become familiar with programming the measurement system. In addition, the KTNE personnel had written some of their own modifications which further refined the system.

The ANSWER has two inputs labeled A and B. In this configuration, the KRNE demodulator output was fed to the A input and the processor output to the B input. Since the input to the processor is telco, operators at KTNE could now check the incoming signal quality and the transmitter output at ANSWER input A. Future plans call for remote-controlled 10x1 switchers on at least one of the inputs so signals may be traced through the entire station via remote control.

With the assistance and cooperation of Tektronix, "patches" have been written into the program which allow the implementation of tasks not originally in the Option 03 program. One of these patches allows graphing up to 36 lines of video, but with reduced resolution. The purpose of this patch is to check for tilt and clamp failure which

readily shows up in the vertical interval. Other patches can provide a graphic readout of what the sync and window values have been for the past 60 minutes, or can even provide a wakeup call for operators at KTNE.

Positive response

The system has served very well now for a little over two years. Even though ANSWER is being used in a different application, it performs exactly as designed—to give accurate measurements. The operators trust the system because of its accuracy. Hard copies of the measurements, sent to the network control center for study, provide a consistently accurate picture of what is occurring. Given the geographical distances of the Nebraska Network, this is a tremendous time and energy saver.

Further improvements

Some further improvements in the system are planned for the future. The major concern, with regard to outages caused by remote control, has been loss of control lines and the required shutdown upon loss of remote control. Normally, for other than very short outages, a control line loss initiates the callout to one of the two operators. Due to the distances involved, however, it can take an operator an hour or more just to travel to the transmitter. During this time, the transmitter is off the air unless the control line has been restored. Thus, it is extremely important that the network have a reliable control line.

A major step taken to reduce control line outages was the installation of Racal-Milgo Omnimode 48 modems, which gives the system operation of 4800 baud or 2400 baud on each input. This increase in baud rate makes the Moseley and ANSWER systems more responsive to operator commands.

The Nebraska Educational Telecommunications Network has been very pleased with this method of solving the off-air monitoring problem. It is now planning to install two more systems which will allow KLNE-TV to remotely control KMNE-TV and KPNE-TV.

Thanks to this new automated monitoring system, the large network of Nebraska's educational TV stations can now proceed with safety. **BM/E**

Larry Evans is an assistant director of engineering and transmissions for Nebraska Educational Television.

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New Prism Stretches Camera Capabilities

Until now, the versatility of $\frac{2}{3}$ -inch format cameras has been limited by their relatively poor sensitivity and great depth of field.

With the development of a new f/1.2 prism, however, Canon is offering a solution.

By Robert Rivlin, Editor

The history of television, as we know, is relatively short. Many of us can remember when the idea of transmitting pictures through the ozone into thousands of homes was merely a dream—and a fantastic dream at that.

But ever since that dream first became a reality, television has been undergoing a constant evolution. Thanks to broadcasters who recognize that, despite the incredible technology that surrounds us today, we can do something to make it even better.

The television camera has certainly evolved, from the Image Orthocons equipped with triple-turret lenses that brought us shows in black, white, and several shades of gray, to today's generation of compact, computer-

controlled color cameras equipped with zoom lenses.

In fact, we are witnessing the dawn of yet another generation of cameras—even more compact with even greater capabilities—thanks to ongoing research and development of the $\frac{2}{3}$ -inch format.

The performance, functions and capabilities of today's $\frac{2}{3}$ -inch cameras far exceed what anyone could have envisioned just a short while ago. From certain performance standpoints, the $\frac{2}{3}$ -inch cameras are equal to or even surpass large format $1\frac{1}{4}$ - and one-inch color cameras.

$\frac{2}{3}$ -inch limitations

If $\frac{2}{3}$ -inch cameras have significant limitations when compared to their large-format counterparts, however,

they are in the areas of sensitivity and depth of field. Typically, they don't provide enough sensitivity and they provide too much depth of field. Until now, it was thought these problems were virtually impossible to solve due to the physical limitations imposed on prism and lens design by the $\frac{2}{3}$ -inch tube. A breakthrough is at hand, though, in the form of a new f/1.2 four-piece prism designed by engineers Shiomi Kanie and Kiyoshi Fukami of Canon, Inc.

Typically, $\frac{2}{3}$ -inch cameras are equipped with zoom lenses with a maximum aperture of f/1.6 and, less often, f/1.4. This is primarily because the typical three-piece beam-splitting prism inside the camera, designed with the ideal dimensions to transmit light to $\frac{2}{3}$ -inch tubes, is limited to receiving light from lenses with a maximum aperture of f/1.4.

Table 1 is an equivalency chart comparing the relative optical requirements of $1\frac{1}{4}$ -inch, one-inch and $\frac{2}{3}$ -inch tubes. Assigning state of the art sensitivity a value of one, you will note that an f/1.6 lens and an f/1.6 prism are required to produce the same sensitivity on a one-inch camera as produced by an f/2.1 lens and an f/2 prism on a $1\frac{1}{4}$ -inch camera. These numbers are derived in the same way we determine the proper focal length required to produce the same angle of view on cameras of

Tube Size	Equivalent Aperture	Existent		Sensitivity (normalized)	Depth of Field (normalized)
		Lens	Prism		
$1\frac{1}{4}$ "	f/2.1	f/2.1	f/2	1	1
1"	f/1.6	f/1.6	f/1.6	1	1
$\frac{2}{3}$ " Canon new prism & J4OX lens	f/1.1	f/1.6	f/1.4	0.47 (with f/1.6 lens)	1.45 (deeper)
		f/1.2	f/1.2	0.84 5.04 dB UP	1.05 28 percent shallow

Table 1. The Canon f/1.2 four-piece prism, in combination with an f/1.2 lens, increases sensitivity by more than 5 dB and diminishes depth of field by 28 percent.

different formats.

The column labeled "equivalent aperture" shows that, ideally, an $f/1.1$ lens and $f/1.1$ prism would produce the same level of sensitivity on a $\frac{2}{3}$ -inch camera. Unfortunately, this is still out of reach. But continuing across to the right on Table 1 we see that the typical combination of an $f/1.6$ lens and $f/1.4$ prism yields less than half the sensitivity we can get with large format cameras. Thus, the currently available $\frac{2}{3}$ -inch cameras are severely limited under low-light shooting conditions.

Due to the smaller relative aperture we can also see that depth of field is increased by almost 50 percent, making it more difficult to isolate a subject and eliminate a distracting background with this combination of lens and prism.

Sensitivity boost

Table 1 shows the great significance of Canon's $f/1.2$ four-piece prism. When used in combination with an $f/1.2$ lens, sensitivity is increased by more than five dB—reaching 84 percent of the sensitivity available with large format cameras. Depth of field is diminished by 28 percent also, giving the $\frac{2}{3}$ -inch camera virtually the same

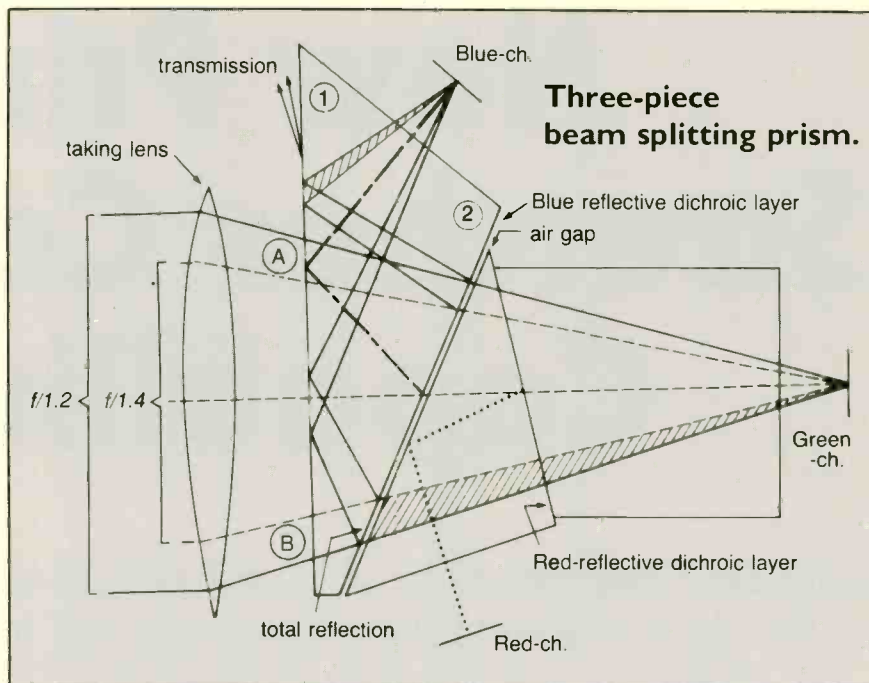


Figure 1. Typical three-piece $f/1.4$ beam-splitting prism.

degree of creative control as the larger format cameras.

Despite all these obvious advantages, no one has been able to successfully incorporate an $f/1.2$ prism into a

$\frac{2}{3}$ -inch camera until now. One reason was the widely held belief that the laws of physics stood in the way. We can more fully appreciate this if we examine the design of a typical $f/1.4$ beam-

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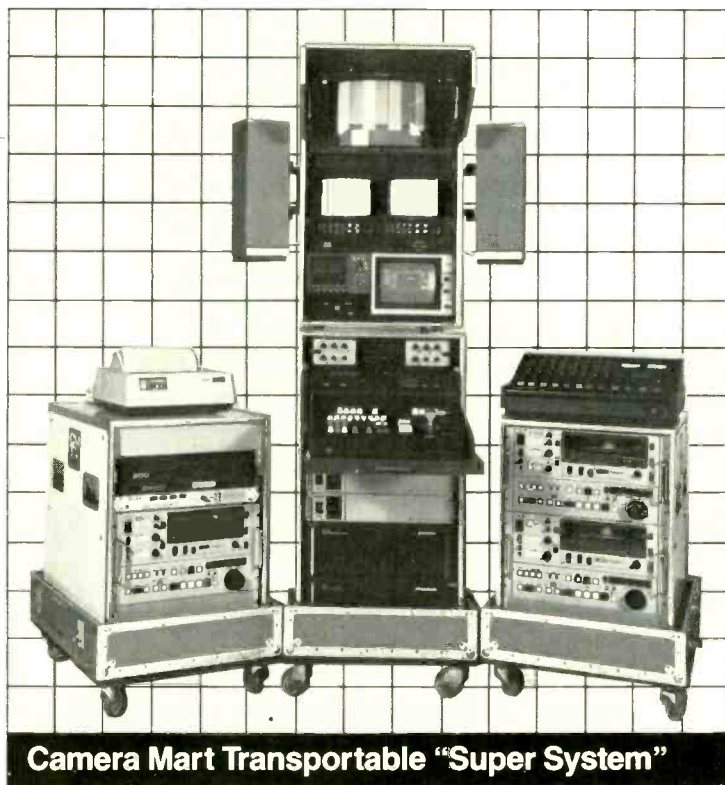
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splitting prism, composed of three glass blocks as illustrated in Figure 1.

Light rays passing through the lens enter the first prism block. Only blue colored light will be totally reflected by the blue-reflective dichroic layer on this block and, as you can see, will be reflected to focus on the blue-channel tube.

Red and green light passes through the blue-reflective dichroic layer and enters the second prism block, where red light will be totally reflected by the red-reflective dichroic layer to focus on the red-channel tube.

Green colored light passes through the red-reflective layer, enters the third block and reaches focus on the green channel tube.

That's how the prism works. Building it was a bit more complicated.

The angle of inclination of the rear plane of the first prism block—labeled number two in Figure 1—depends on the f-number of the lens and the index of the prism glass. The lower limit of inclination at two should be set so as to reflect 100 percent of the blue colored light onto the front plane—labeled number one. This lower limit of inclination becomes greater as the maxi-

mum aperture of the lens increases.

On the other hand, the upper limit of inclination at two is determined by the need to allow the remaining red and green light to pass through the blue-reflective dichroic layer at this plane. This upper limit of inclination becomes *smaller* as the maximum aperture of the lens increases. When these upper and lower limits of inclination coincide with each other, the maximum aperture of the lens cannot be further increased.

Using this three-piece prism design, it is generally agreed that this condition is reached with a maximum aperture of approximately $f/1.4$, subject to slight variations according to the index of the prism glass used.

In case you are wondering, Figure 1 also illustrates what will happen if a faster, $f/1.2$ lens is used in combination with this typical $f/1.4$, three-piece prism.

The blue colored light entering the first prism block from area "A" will be reflected by the blue-reflective dichroic layer but not all of it will be reflected when it reaches the front plane—one. Instead, some of it will escape the prism due to the small angle of incidence at one.

Further, the light included in area "B" strikes the rear plane—two—at such a large angle of incidence that it is reflected and does not pass through to the second and third prism blocks to reach the red and green channel tubes.

Therefore, using an $f/1.2$ lens in combination with this $f/1.4$ prism results in a loss of part of the light and so significant a shift in the ratio of the blue, red, and green light reaching their respective color channel tubes as to make it impossible to achieve a white balance.

Four-piece prism

The $f/1.2$ four-piece prism created by Canon engineers Kanie and Fukami includes a wedge-shaped prism block in front separated from the second prism block by an air gap, as shown in Figure 2.

Basically, the problem of lost blue light is solved because the blue light reflected from the blue-reflective layer at two strikes in the front plane—one, which is leaning in this design—at a larger angle of incidence, and 100 percent of it reaches focus at the blue-channel tube.

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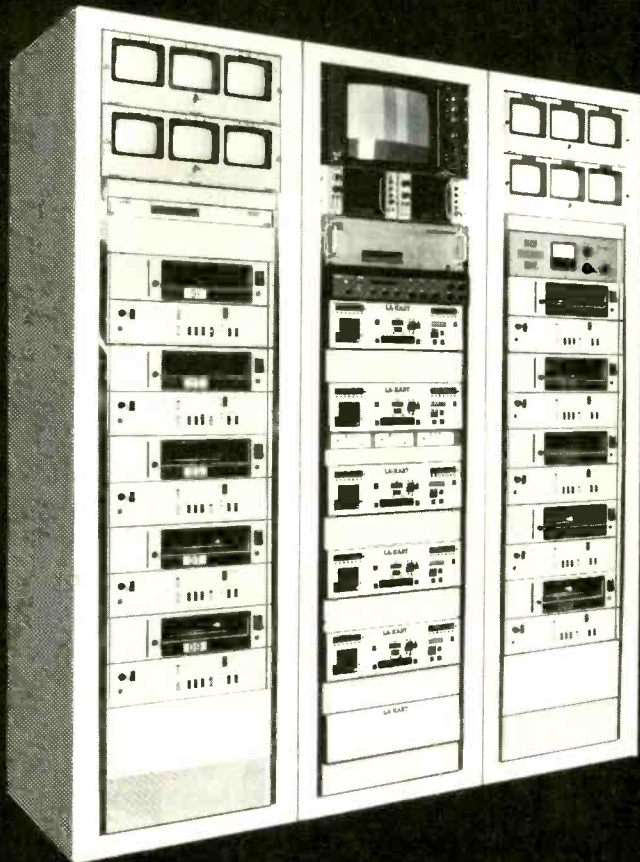


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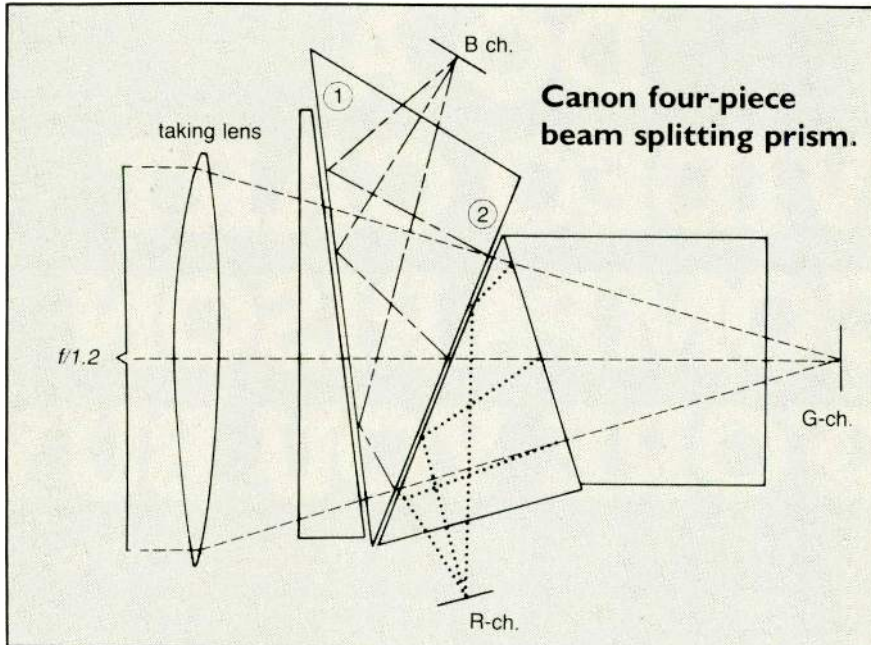


Figure 2. The new four-piece $f/1.2$ prism solves the problem of lost blue light that occurs when an $f/1.2$ lens is used with an $f/1.4$ prism.

the three-piece prism, the rear plane of the second prism block—two—is more vertical and allows all of the red and green light to pass through to the third and fourth blocks and reach their re-

spective color channel tubes.

Once developed in theory, there was great difficulty in designing and finally manufacturing the $f/1.2$ four-piece prism successfully. Three specific

problems were encountered:

First, as may not be obvious from the diagrams, the $f/1.2$ four-piece prism requires larger individual pieces of glass. These are more difficult to obtain with the high transmission index required for this application and slightly more difficult to grind and polish to constant, microscopic tolerances.

Second, increasing the number of component parts in the prism from three to four magnified by many times the problems of alignment, as well as greatly increasing the necessity for absolute manufacturing accuracy.

The third and most obvious problem was the greatly increased difficulty in preventing ghost images due to the increased number of reflective surfaces. This was clearly the greatest challenge of the three.

The problems of the larger pieces of high-index glass and maintaining the necessary high standards of quality control were solved primarily because of the long experience of Canon's engineers and technicians. In addition, the company employed very high-quality, specialized numerical control machines in manufacturing the individual components of the four-piece prism. Simi-

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larly, special jigs—themselves built to micron tolerances—were used in the alignment process.

Computer design

However, solving the problem of internal reflections and ghost images was something that truly may not have been possible just a few years ago. Canon employed a very sophisticated, high performance computer for this task. Canon engineers then developed their own software, which creates a computer simulation of the path light will take as it moves through optical devices. Essentially, the computer determines the precise path the light will take as it enters the prism and passes through each block. It finds each point of reflection and searches out ghost images, so we can eliminate them. And we have.

So the solution to the problem of creating an $f/1.2$ prism for $\frac{2}{3}$ -inch cameras was solved through Canon's precision optical engineering, higher quality control standards, and sophisticated computer simulation. As this prism is incorporated into the next generation of $\frac{2}{3}$ -inch cameras, their capabilities will be greatly enhanced.

To fully realize the capabilities of the $f/1.2$ four-piece prism, Canon has introduced a new J40x9.5B $f/1.2$ lens. Designed specifically to be used on cameras incorporating the $f/1.2$ prism, this new field lens has a powerful (40X) zoom ratio. Despite its range, it is a true $f/1.2$ zoom, a full stop brighter than conventional lenses at any focal length. However, although designed for $\frac{2}{3}$ -inch tube cameras, its great zoom ratio and very large $f/1.2$ relative aperture make the new lens virtually as large as its counterparts designed for one- and $1\frac{1}{4}$ -inch cameras.

One final fact about the prism is that because its optical path is nearly the same as that of conventional high index prisms, it is possible to use conventional lenses with excellent results. Therefore, the acquisition of new $\frac{2}{3}$ -inch cameras with the $f/1.2$ prism will not make existing lenses obsolete.

Canon's successful creation of the $f/1.2$ four-piece prism has eliminated two primary drawbacks that have prevented $\frac{2}{3}$ -inch cameras from becoming the mainstay of the broadcast television industry; too little sensitivity and too much depth of field.

While these developments do not give $\frac{2}{3}$ -inch cameras total parity with their larger counterparts, they are sure to expand the usage of small-format cameras in many fields. **BM/E**

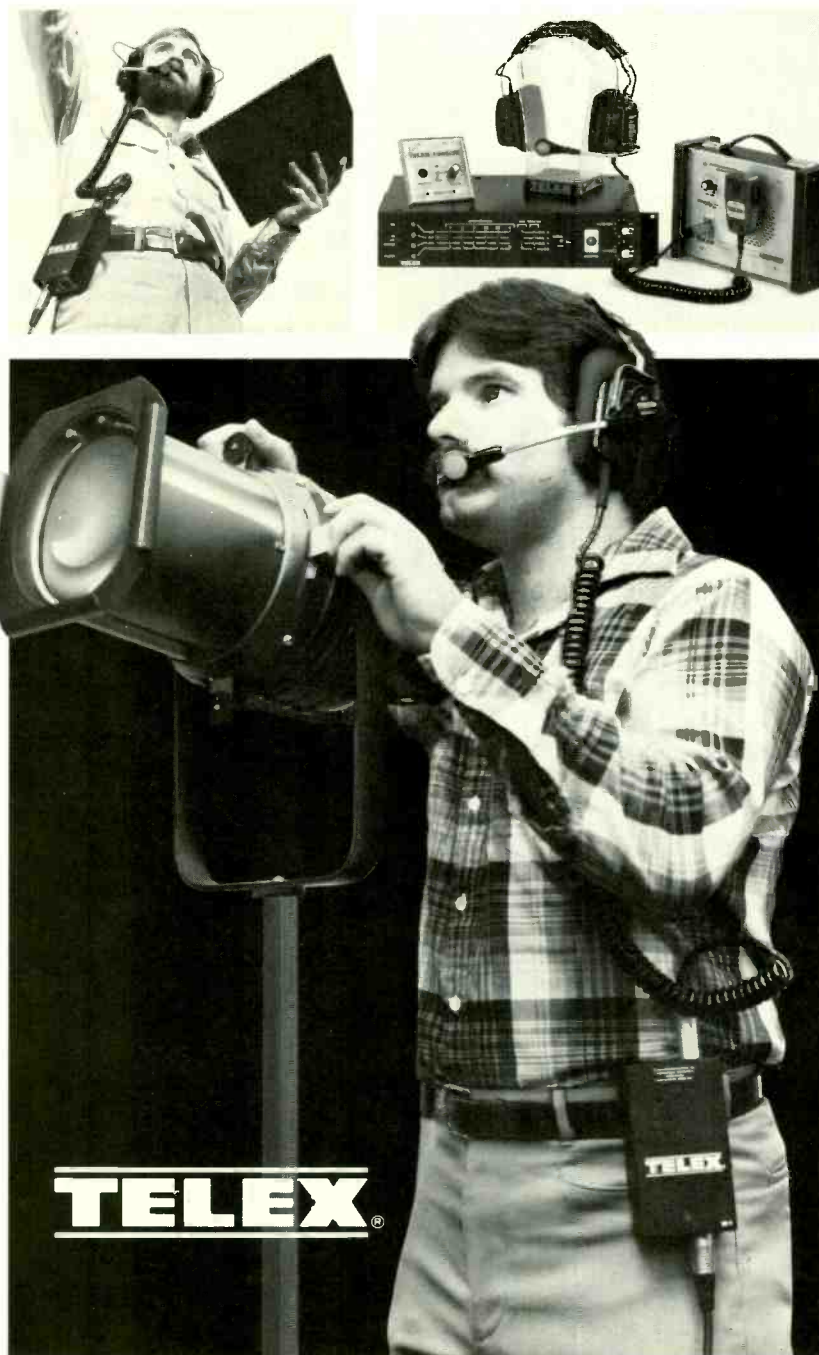
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Industry Needs: A Decade of Transition

BM/E's annual Survey of Broadcast Industry Needs shows spending significantly increased for 1985, while a 10-year retrospective of past survey results shows many significant changes in the industry.

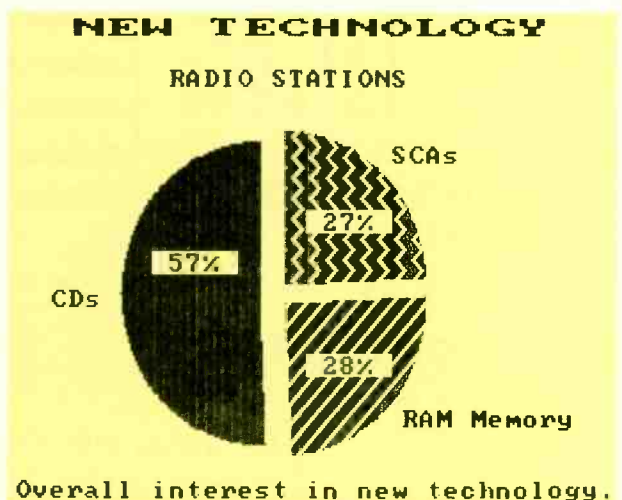
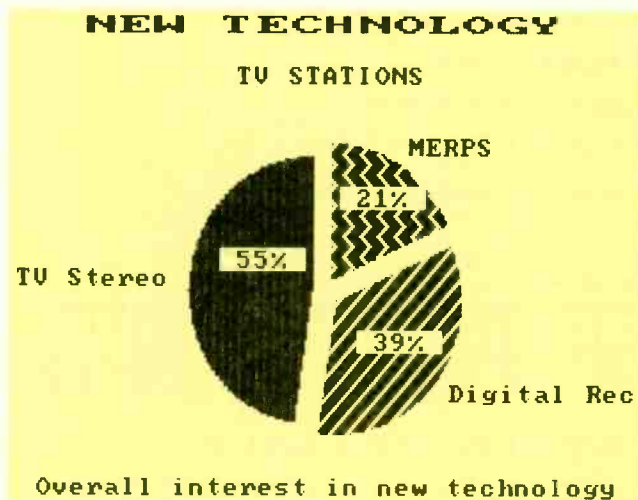
Staff Report

The year was 1975. In the television industry, ENG was just getting off the ground. Production and post-production methods were becoming increasingly sophisticated, introducing the need for both better VTRs, and a new generation of time base correctors. *BM/E's* annual survey of broadcast industry needs—called "The Panels of 100 Survey" back then because questionnaires were mailed out to groups of 100 each of engineers and managers at radio and TV stations, showed the top five products as TBCs, production switchers, character generators, quad VTRs, and portable cameras. At the bottom of the list were master control switchers, transmitters, and medium- and high-priced cameras.

On the radio side, reel-to-reel decks were the number one item of interest for those planning to go the NAB show (held in Las Vegas that year). After consoles and cart decks, studio automation equipment was the next most important product. FM products were on the bottom of the list. And test equipment was number six and turntables number 12 out of a total of 15 products surveyed that year.

Nineteen eighty, just five years later, and it seems the whole industry has turned completely around. ENG cameras are now the number one priority among TV broadcasters going to the show, followed by one-inch VTRs, videotape editors, 3/4-inch VTRs, and microwave for ENG. Quad VTRs have already fallen to the bottom of the list, which now numbers 31 products. Digital effects are in the number eight position, electronic still stores number 12, character generators number 22. A separate question, "which technologies do you expect to have the greatest impact on your operations over the next two years?," found 31 percent voting for further computerization, 26 percent voting for further ENG developments, and 25 percent voting for installation of an earth station.

On the radio side, the 1980 list of "most wanted products," now 22 items long, still had studio ATRs on top. FM quad had already come and gone, and was last on the list. Studio automation equipment had fallen to number 16, field ATRs were only number 15, reverb and special effects were just one number ahead of FM quad, but remote pickup equipment was in the number three spot, just behind consoles and mixers. Asked the same special question about which technology would have the most



impact in the next two years, radio broadcasters gave the edge to AM stereo, with 24 percent of broadcasters voting for it. Digital technology, earth station equipment, and further computerization each received 20 or 21 percent.

Nineteen eighty five. This year, 3000 survey forms have been mailed out to a cross section of BME's subscriber list, and the results tallied for not only TV and radio stations but teleproduction facilities as well. Within both TV and radio rankings, we also show how the industry voted for its "most wanted products" by market size. There are 47 products listed for television, 31 for radio. And this year for the first time, reflecting the increasing demand for quality audio in the TV medium, TV stations and facilities have been asked what their priorities will be for purchasing specific kinds of audio equipment during the coming year.

Industry responds to pressure

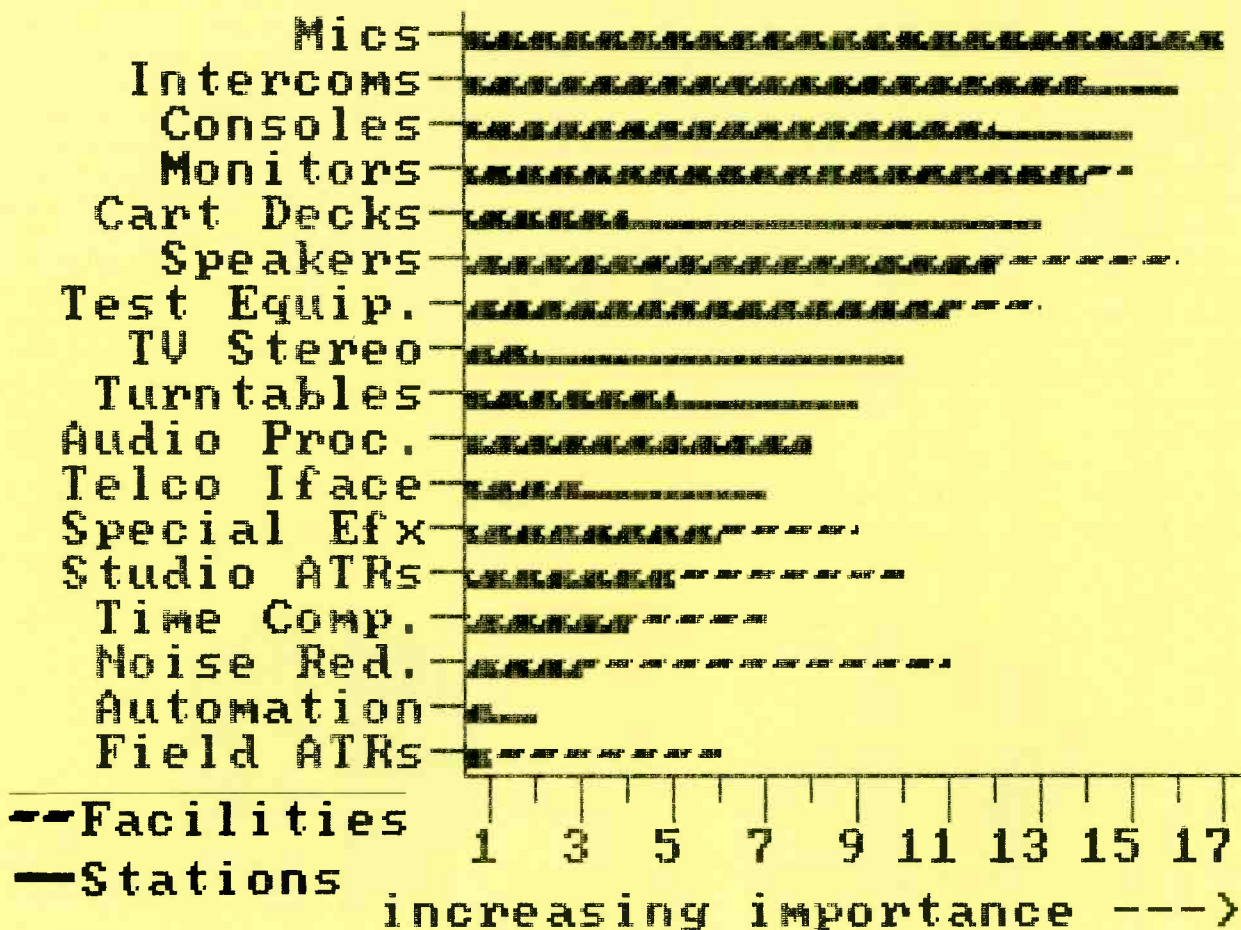
Perhaps the most significant finding in the study this year is that the industry—both radio and television—continues to evolve in response to market pressures to be as up-to-date as possible. High, high on the list for the TV station and facility are devices such as character generators and digital effects devices; there's no mistaking the need, in every size market, to have an on-air look which says the station cares about its image. Similarly, not only

are ENG cameras and studio/field cameras maintaining their places near the top of the list, but studio cameras have suddenly come into the foreground as being priorities for the broadcaster (the number one priority for medium-market stations, and number six in the overall rankings, rising from number 22 last year).

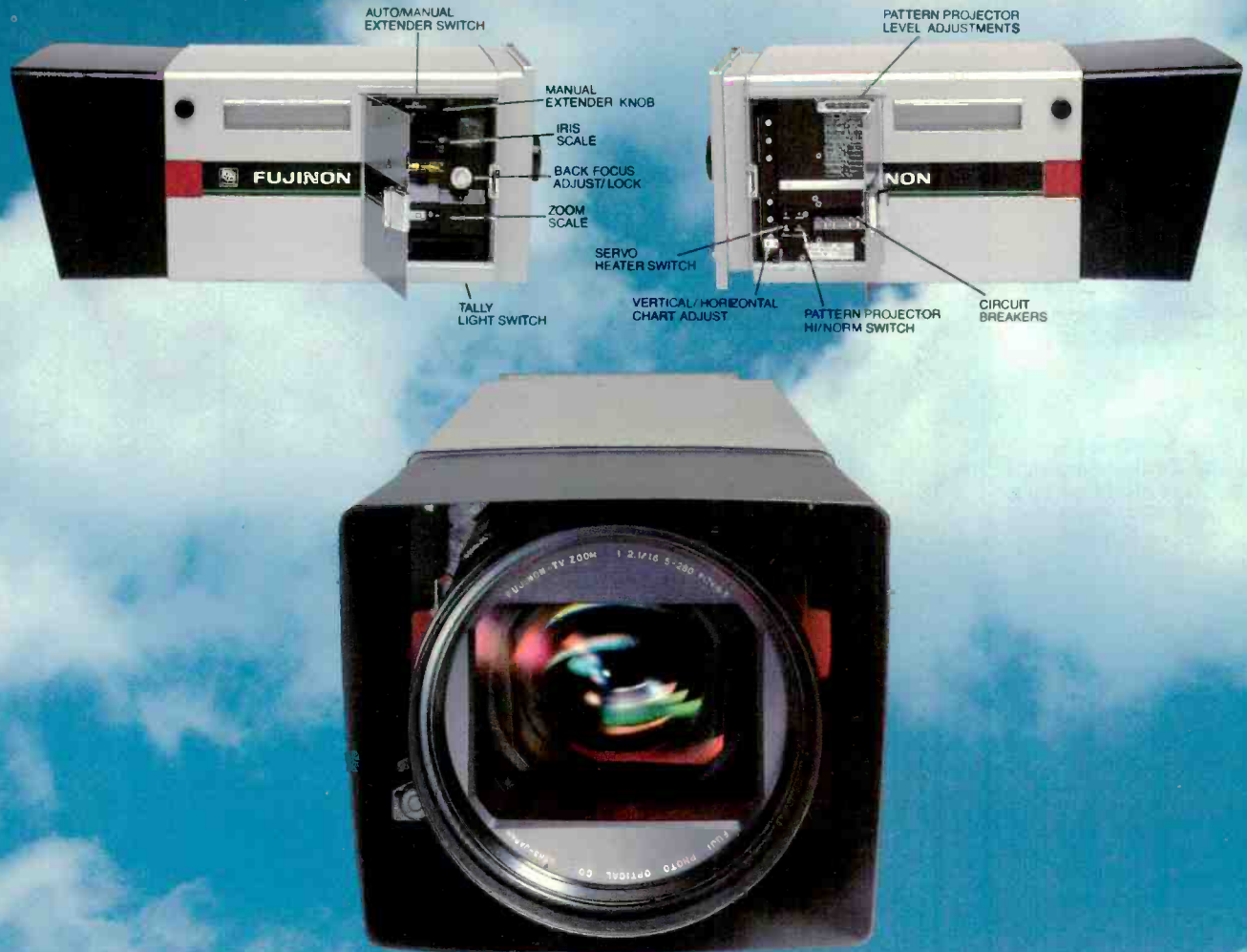
Other trends emerge, too:

- Newsroom computers are the number two priority at large-market stations.
- Test equipment among TV broadcasters has suddenly fallen from number eight to number 16. A possible cause; broadcasters this year, with more money to spend, are less interested in maintaining equipment than they are in buying new gear.
- Satellite earth stations, which hit their peak of interest in 1981, continue their slow decline in interest.
- Interest in 3/4-inch VCRs has fallen off for the first time since we began keeping records (number one in 1983 and 1984, but only number 11 in 1985) while interest in half-inch VCRs has suddenly taken off like wildfire, rising from number 20 last year to number nine this year.
- Despite the ballyhoo over recorder/cameras, and the new MERPS replacements for quad cart automation systems, recorder/cameras are still fairly low on most broadcasters' priority lists, with little change

TV AUDIO PURCHASING



FUJINON'S revolutionary 2-door zoom lens.



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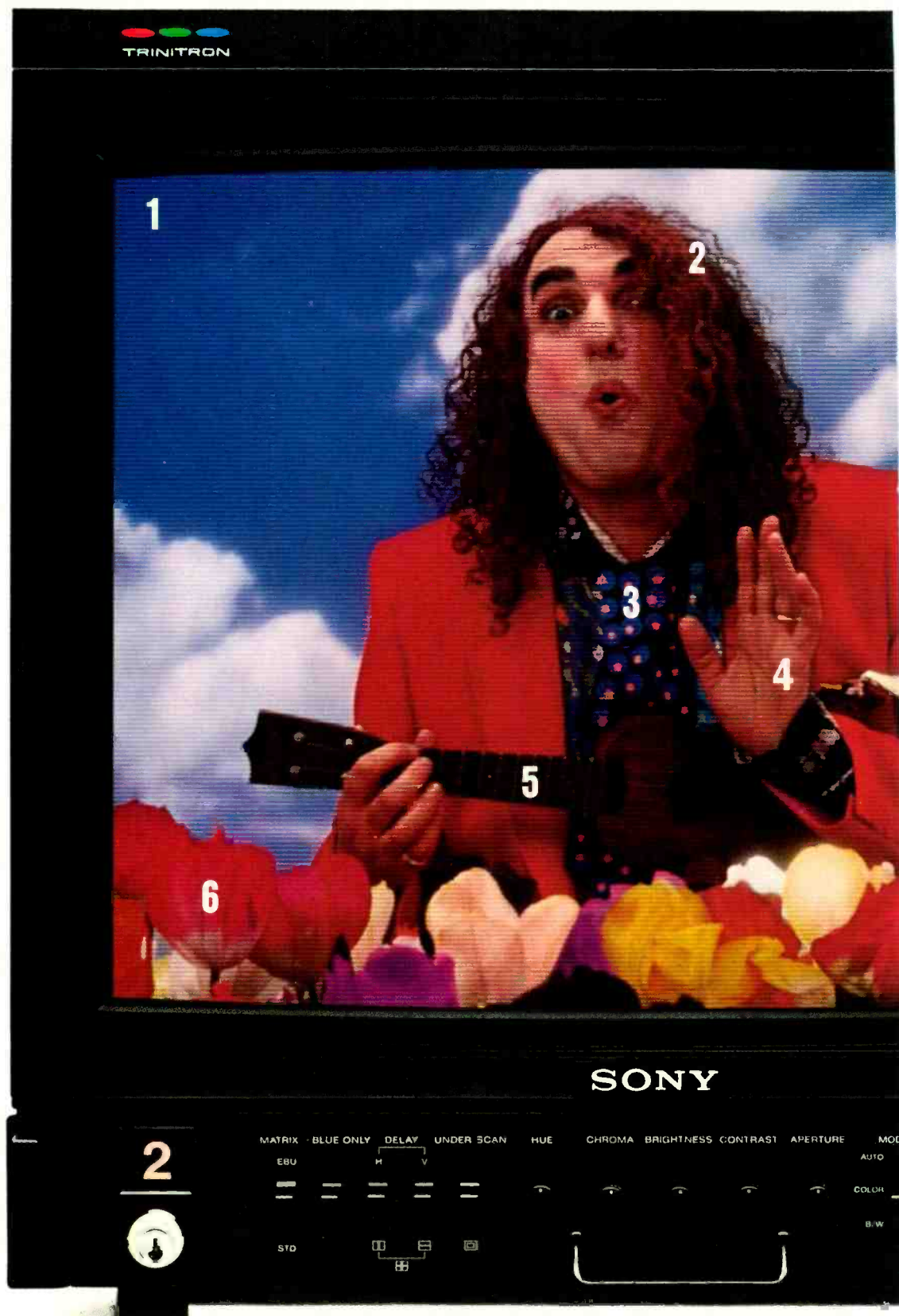
2 Nine-hundred TV lines for the highest resolution of any master control CRT—so details are sharper, and noise is never hidden.

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4 ± 5 mm convergence within center circle—to prevent outlines from appearing around images.

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since last year; and MERPS systems are down even closer to the bottom of the list.

The latter is borne out by another part of the study, a question on which areas of new technology will be most interesting to stations and facilities in 1985. Surprisingly, MERPS were interesting to only 31 percent of respondents in top-market stations, 4 percent in medium markets, and 29 percent in small markets. By comparison, multichannel sound scored 69 percent in top markets, 32 percent in medium markets, and 54 percent in small markets. (See accompanying chart.)

Radio more cautious

Among radio stations, the changes are less dramatic. Cart decks, consoles and mixers, microphones, and test equipment continue in the number one to four positions they have held for some time. Nonetheless, there are several significant trends:

- Turntables have become extremely popular again, this year in the number five position, having slipped to number 10 last year.
- Medium-market stations show several indications of going against the patterns being established in the rest of the industry. Noise reduction equipment, number 16 in the overall rankings, is number six among medium-market stations; Reverb and special

effects equipment, number 18 in the overall list, is number three in Metro ranks 11-50; and whereas the rest of the industry ranks cart decks as number one, they are only number 10 in the mid-sized markets.

- FM transmitters, among small- and medium-market stations, will be of significant interest this year.

Further, contrary to what some describe as a static medium, radio broadcasters are most certainly interested in new technology. Heading the list of new developments which radio broadcasters will be eyeing are compact disc players, scoring 60 percent interest in top market, 67 percent in medium market, and 44 percent in small market stations. Second on the list of interest was solid-state audio memory, scoring 35 percent, 28 percent, and 23 percent in large-, medium-, and small-market stations respectively. On the subject of SCAs, small market stations are the most interested—34 percent.

Spending to increase dramatically

Fueling all these interests in new products and new technology is the finding that, in all parts of the industry, capital budgets for 1985 are up, up, up. Overall, 63 percent of radio stations will increase their budgets in 1985, 18 percent will remain the same, and 19 percent will see a decrease. This will mean an industrywide total increase in capital spending of approximately 25 percent (30 percent

Radio's Most Wanted Products

1985 Rankings ¹															
Metro	Metro	Metro	Product	85	84	83	82	81	80	79	78	77	76	75	
1-10	11-50	51+	Cart Decks	1	2	1	4	5	4	4	6	2	4	3	
3	10	1	Consoles, Mixers	2	1	2	3	1	2	2	2	4	2	22	
7	7	2	Microphones, Accessories	3	3	3	7	***	7	6	5	5	8		
2	1	4	Test Equipment	4	8	4	5	3	5	5	4				
1	2	6	Turntables	5	10	7	10	14	12	10	12				
15	11	3	Audio Processors	6	4	5	1	4	6	3	3	3	5	5	
9	4	5	Monitoring Equipment ²	7	7	6	12	10	14	9	15	6	10	9	
4	5	7	Monitor Speakers	8	6	12	15	19	19	16	14				
6	8	10	Antennas	9	9	17	11	9	9	14	20				
12	12	9	FM Transmitters	10	21	19	14	13	13	12	16	9	13	14	
23	9	8	STLs, TSLs*	11											
8	20	12	Telco Interface Equipment	12	15	15	13	12							
10	15	11	Satellite Earth Stations	13	11	8	6	7							
27	14	13	Studio ATRs	14	17	12	2	2	1	1	1	1	1	1	
5	25	16	RPU and RENG**	15	5	8	9	6	3	7	7	7	7	7	
11	16	17	Noise Reduction Equipment	16	16	10	8	8	11	11	10	8	9	8	
16	6	18	Remote Control Equipment*	17											
13	13	19	Reverb and Special Effects	18	18	18	19	20	21	21	19				
22	3	20													
31	21	14	AM Transmitters	19	12	20	17	16	10	13	11	11	13	10	
14	19	22	Power Supplies	21	14	11									
21	26	21	Studio Automation Equipment	22	22	22	16	11	16	17	13	10	8	4	
17	18	25	Mobile Vans	23	20	24									
18	24	24	Newsroom Computers*	24											
30	22	23	Business Automation	25	19	15	23	21	17	20	17	13			
29	30	26	Intercoms	26*											
20	29	27	ATS Equipment	27	25	26	22	18	18	18	9				
26	17	30	Time Compression Systems	28	23	14									
19	27	28	Field ATRs	29	24	23	18	15	15	19	21				
24	23	29	Digital ATRs	30	26	21									
28	31	31	Fiber optic Systems*	31											

* Not previously reported

** Reported previously as "RPU and STL"

*** Microphones not reported in 1981

1. Overall ranking determined by total respondents indicating high and medium priorities multiplied by weighting factors.

2. Reported as "AM Monitoring Equipment" and "FM Monitoring Equipment" 1978-1981.

OPTIMOD-AM[®] STEREO.

In the past, if you were considering C-QUAM[®]AM stereo, the exciter manufacturer may have suggested a certain audio processor. But now you have a choice—after extensive testing in Motorola's lab, OPTIMOD-AM Model 9100A/2 with the new #1-S Stereo Compatibility Card has been fully approved by Motorola for use in C-QUAM installations. There are *already* scores of 9100A/2's driving C-QUAM exciters. Now that Motorola is telling its customers and using the 9100A/2 to demonstrate their system at trade shows and technical exhibitions, we expect OPTIMOD-AM to become an even more popular choice for C-QUAM stereo. (In addition to C-QUAM, the versatile 9100A/2 can be configured to operate ideally with any of the other AM stereo systems.)

OPTIMOD-AM:

The Original AM Stereo Matrix Processor

Our 9100A/2 was designed *from the ground up* for the matrix (sum-and-difference) processing that is necessary to achieve full loudness on mono radios. So we only need to use *two* carefully-harmonized AGC stages from input to output: a slow "hand on the pot" AGC, and a six-band limiter with patented distortion-cancelled multiband clipper. The result? Competitive loudness is complemented by uncanny smoothness and naturalness. Pumping and other processing artifacts are below perceptibility. And efficient single-chassis card-cage construction assures easy circuit board access without removing the unit from the rack.

In contrast, the competition added a matrix processor onto an existing non-matrix system. There are four boxes, four power supplies, and up to *six* stages of AGC in cascade. One large board is used per box, making updates and repairs inconvenient. Is it any wonder that this system not only introduces more processing artifacts, but is also substantially *costlier* than OPTIMOD-AM?

-Single-Channel Modulation Control

To prevent distortion in C-QUAM receivers, Motorola recommends limiting single-channel modulation to 75% negative. In published advertising, our competitor has falsely claimed that our system works by switching to mono under single-channel conditions. In fact, we perform as much control as possible by L and R clipping. Distortion is prevented by a variable-blend circuit which reduces L-R gain as necessary to prevent overdriving the clippers. On most program material, the effect is inaudible. On material with extreme stereo separation, image width is slightly reduced. However, the signal never becomes mono, or even close to it. And sound on mono radios is *never audibly affected*. Because most of your diary-holders will be listening in mono for some time to come, we think this point is crucial.

In contrast, our competitor performs this control by means of limiters in the L and R channels. If the limiters are not coupled, this can cause a stereo image shift similar to "platform motion." And this circuit can punch "holes" in both stereo *and* mono when the limiters act.

As usual, there's no free lunch. But Orban's system fully protects your mono listeners, while our competitor's doesn't.

Preemphasis

OPTIMOD-AM offers a continuously-variable front-panel HF EQ control. This boosts high frequencies to extend the effective bandwidth of the receiver, providing a sound more competitive with FM. Its curves were computer-optimized on the basis of a two-year engineering study of typical auto, table, and portable radios. With the introduction of new wider-band AM stereo radios, we made available three plug-in modules which can change the *family of curves* produced by the HF EQ control to suit the needs of your target audience. In addition, we provide a fully-parametric BASS EQ control.

The competition offers an EQ control on their matrix processor which provides only a single curve family of unspecified origin. If you use their four-band compressor, you also get a four-band graphic-type equalizer.

We believe that most stations do not want or need excessive numbers of equalization controls which, if misadjusted, can easily produce colored, honky, unnatural, and fatiguing sound. OPTIMOD provides controls to get the sound right—not controls to lead you astray.

But if your situation demands a broader equalization range, you can combine our 622B stereo Parametric Equalizer with OPTIMOD-AM to create an integrated *system* with far more powerful equalization capabilities than the competition—at about the same cost as our competitor's processor alone!*

Consistency

Many consultants now believe that one of the keys to a polished, professional, audience-building sound is *consistency* in texture and tonal balance from source to source. OPTIMOD-AM's six-band limiter with steep-slope crossovers provides this consistency automatically—laborious re-equalization and processing in the production studio are almost never required.

MOTOROLA
APPROVED



Even with their four-band compressor, the competition can't match this level of consistency because of their compressor and crossover design. The longer you listen, the more you'll appreciate OPTIMOD-AM's superiority.

Protecting Your Investment

We like to think that Orban earned its #1 place in audio processing with a solidly-engineered and superb-sounding product line which is backed with ten years of quality, reliability, and customer service—plus the best manuals and documentation in the industry. Plug-in construction allows low-cost updates as AM stereo technology advances. All these factors combine to protect your substantial investment in AM stereo processing—for C-QUAM, or any other system.

Fighting The FM Challenge

Your FM competition is after your audience share. OPTIMOD-AM offers a remarkably favorable tradeoff between loudness and processing artifacts, plus smoothness, consistency, and a bright, open sound that holds its own against FM stereo—on *real-world* AM radios.

When you add it all up, it becomes clear that there's really only *one* choice for AM Stereo processing: OPTIMOD-AM 9100A/2.

—Robert Orban

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Circle 148 on Reader Service Card

TV/Teleproduction's Most Wanted Products

1985 Rankings ²																		
ADI 1-10	ADI 11-50	ADI 51+	Tele- prod. ¹	Products	85	84	83	82	81	80	79	78	77	76	75			
7	2	2	12	ENG Cameras	1	6	4	2	3	1	2	1	1	1	1	6		
1	12	1	10	Character Generators	2	4	7	14	21	22	12	12	6	4	4			
4	3	11	3	Studio/Field Cameras ³	3	7	6	3	11	11	10	22	24	21	19			
9	8	8	11	Digital Effects Devices	4	13	9	9	4	8	5	16						
3	14	9	1	Video Monitors	5	2	2	6	10	10	8	10	7	7	10			
15	1	18	19	Studio Cameras ⁴	6	22	23	12	13	16	13	17	14	13	18			
6	15	3	31	Time Base Correctors	7	3	3	8	6	6	3	4	4	2	1			
1	4	12	5	VTRs, one-inch ⁵	8	5	17	1	1	2	1	2	10					
5	11	19	14	VTRs, half-inch	9	20	23											
19	5	15	8	Power Supplies, Batteries	10	10	10											
8	19	6	2	VTRs, 3/4-inch ⁶	11	1	1	5	7	4	4	5	2	13				
25	9	5	9	Lighting & Camera Support	12	12	7	23	26	19	27	27						
18	7	13	4	Production Switchers	13	9	14	18	16	21	23	21	17	14	2			
17	6	21	18	Audio Consoles, Equipment	14	14	17	21	22	13	18	20	13	12	8			
10	24	10	16	Routing Switchers	15	18	16	25	14	21	17	13	15	20	14			
12	10	25	7	Test Equipment	16	8	5	10	5	7	7	3	9	5	7			
21	32	7	21	Frame Synchronizers	17	11	10	11	8	9	11	7	8					
13	13	27	15	Time Code Equipment	18	16	14	22	23	20	16	14						
30	30	4	**	Satellite Earth Stations	19	15	10	4	2									
27	22	17	17	Simple VTR Editor/Controllers ⁷	20	21	10	19	6	3	6	6	4	10	12			
16	25	20	20	Electronic Still Stores	21	17	21	7	12	12	14	11	5					
22	17	23	25	Recorder/Camera Combos	22	25	26											
23	16	24	6	Multisource Video Editors ⁷	23	19	19	16										
14	27	22	30	ENG/EFP Vehicles	24	29	29	24	27									
2	29	14	**	Newsroom Computers*	25													
29	8	28	**	Microwave for ENG	26	28	25	13	9	5	9	8	12	6				
35	28	16	**	Master Control Switchers	27	27	28	28										
32	23	33	13	Digital Art/Paint Systems	28	23	32											
33	21	30	28	Switching Automation ⁸	29	34	32	27	20	14	19	15	16	19				
28	20	38	24	Noise Reduction Systems	30	24	19	15	18	17	20	9						
34	25	29	26	Telecines	31	33	27	26	15	25	28	25	20	17	11			
24	31	40	22	Image Enhancers	32	26	21	17	25	26	15	24						
26	33	39	**	MERPS Automation	33	31	35											
33	34	34	23	Video Animation Systems*	34													
31	44	31	**	Weather Radar/Graphics	35	30	30											
36	41	32	27	Fiberoptic Systems*	36													
38	43	26	**	Remote Control	37	35	30	29	19	24	24	19	22	11	16			
40	42	36	**	Antennas ⁹	38	32	38	35	28	28	25	26						
39	35	43	29	Slow-Motion Recorders	39	36	32	31										
37	37	44	32	Teletext Equipment	40	32	39											
42	36	41	**	Transmitters, UHF ¹⁰	41	42	38	33	29	30	30	31	21	16	17			
43	40	35	**	Transmitters, VHF ¹⁰	42	37	36	32	29	30	30	31	21	16	17			
44	39	37	33	VTRs, Quad	43	41	36	36	30	31	29	28	11	9	5			
45	38	45	**	LPTV Equipment	44	39	42											
41	45	46	**	ATS Equipment	45	40	41	37	24	27	22	18						
46	46	42	**	MDS Equipment	46													
47	47	47	**	SMATV Equipment	47													

* Not previously reported.

** Not applicable to teleproduction facilities.

1. Not counted in overall rankings.

2. Overall ranking determined by total respondents indicating high and medium priorities multiplied by weighting factors.

3. Also reported as "Medium-priced Cameras" and "EFP Cameras."

4. Also reported as "Top-of-the-line Cameras."

5. Also reported as "Helical/Segmented VTRs."

6. Reported as "Portable VTRs" 1975-1977.

7. Reported as "Videotape Editors" 1975-1981.

8. Also reported as "Automation Systems."

9. Also reported as "CP Antennas."

10. Reported as "Transmitters" 1975-1982.

in markets 1-10, 11 percent in markets 11-50, and 36 percent in markets 51+).

Overall, 62 percent of TV stations will increase their budgets in 1985, 20 percent will remain the same, and 18 percent will see a decrease. This will mean an industry-wide total increase in capital spending of approximately 21 percent (15 percent in markets 1-10, 27 percent in markets 11-50, and 21 percent in markets 51+).

In the Teleproduction market, 63 percent of facilities will see a rise in capital spending, 10 percent will remain the same, and 27 percent will decrease. This will mean a

increase in spending of approximately 31 percent.

Tied in with these increases in capital spending—outstripping estimated station revenue growth during 1985 of only 12 percent—are the large number of stations and facilities which are planning to move or substantially remodel during the coming year. Among radio stations, this amounts to 30 percent in markets 1-10, over 50 percent in markets 11-50, and 36 percent in small market stations. Among TV stations, the numbers are comparable: 38 percent in large and medium markets, and 21 percent in small markets.

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theatres... anywhere amplified sound is used commercially.
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**"In my opinion, BBE is an indispensable tool in live sound reinforcement. Use of the
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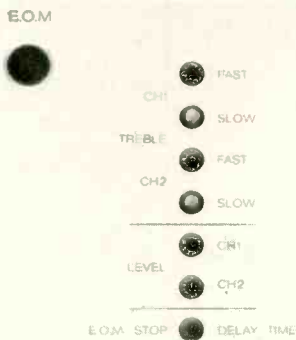
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SMPTE Conference Eyes Component Technology

Staff Report

Components, both analog and digital, and their impact on the future of the television medium will be the theme of the annual SMPTE television conference, set for February 15-16 at the Westin St. Francis Hotel in San Francisco. SMPTE is pulling out all the stops, with more than 30 papers, a component video signal handling demonstration, a panel discussion, and an equipment exhibition. More than 800 engineers, scientists, and broadcasting executives are expected to attend.

Technical papers will be grouped into four half-day sessions covering the following topics: digital components, analog components, future technology, and stereo audio in television. Session chairmen, respectively, are: Gary Thompson, consultant; Merrill Weiss, Imagex; Vinson Perry, Sony; and Joseph Roizen, Telegen. Each session will be opened with a tutorial on the topic to be covered to provide delegates with a brief explanation of the technology and key issues involved.

In keeping with the theme "Components of the Future," the Working Group on Component Analog Video Standards will present a demonstration of the state of the art in this area. This will be the first demonstration to combine both analog and digital component signal handling, much of which represents recent SMPTE standards activity.

The demonstration will be held in the St. Francis Hotel adjacent to the papers and exhibition area. It will incorporate several component video signal sources in both parallel and serial forms. Live camera signals, videotape recordings, and test signals will undergo a variety of processing operations. Component digital portions conforming to the 601 standard will also be featured. The ef-



The St. Francis Hotel.

fects of production processing for chromakey and other special effects will also be demonstrated.

The component signal's performance through various combinations of paths and signal impairments will be shown, as will its performance in simulated MAC/DBS transmission environments. The system will demonstrate the easy translation of component video from serial to parallel and analog to digital, back and forth in a variety of combinations. Compatibility of the serial component analog signal with existing television plants will be shown. Advantages of component processing are expected to be readily apparent, even when the signal is ultimately to be displayed in NTSC.

The equipment exhibition, featuring equipment directly related to the papers

program, will also be set up at the St. Francis. Equipment shown will illustrate the technology presented in the sessions, and attendees will have the opportunity to actually handle it. The manufacturers scheduled to participate—as of press time—are: Ampex, Sony, Ikegami, Orban, Kintek, Harris, Asaca, Merlin, B&B Systems, NEC America, Hughes/Hedco, Grass Valley Group, Digital Services Corp., For-A, Nagra, Sound Technology, Fortel, MCI/Quantel, Abekas, Dolby, and Utah Scientific.

The technical session will get underway Friday morning, but the first official get-together will be a luncheon Friday at noon. Joe Roizen will be the guest speaker.

A full report of the conference will appear in the April issue.

Technical Program

Friday Morning, February 10:

Digital Components

"Digital Component Television Made Easy for Everyone," *E. Stanley Busby, Ampex*

"Digital Production Switchers," *Michel J. Favreau, Thomson-CSF*

"Digital Wideband Framestores,"

Charles Poynton, Poynton Vector

"The All-Digital Studio is Here,"

Dominique Nasse, TDF/CCETT

"Digital TV Tape Recording: A Report Toward a Standard," *Fred Remly, University of Michigan*

"Digital Video Studio Standards: A Progress Report," *Stan Baron, Thomson-CSF*

"The SMPTE/EBU Control Network: A Progress Report," *Thomas Meyer, Dynair Electronics, and Michael Stickler, BBC*

Friday Afternoon:

Analog Components

"Component Analog Tutorial with Progress Report," *Merrill Weiss, Imagex*

"Component Codec," *Larry Thorpe, Sony Broadcast*

"Component Processing in Switchers and TBCs," *Ralph R. Barclay, Barclay*

Research Group, and David E. Acker, For-A

"Latest Status B-MAC System," *John Lowry and Keith Lucas, Scientific-Atlanta*

"Development of the I-PAL System," *Gerhard Holoch and Norbert Mayer, Institut fur Rundfunktechnik*

"The D2-MAC Packet System," *J. Sabatier, CCETT*

"Component Analog Switcher Design—A General Overview," *Birney Deyton, Grass Valley Group*

"A Unique Method for Measuring the Parameters of an Analog Component Signal," *Dan Baker, Tektronix*
Panel Discussion: *Merrill Weiss (moderator), Birney Deyton, Stan Baron, Larry Thorpe, Charles Poynton, Dominique Nasse*

Saturday Morning, February 16: Future Technology

"Technical History of Home VCR Development," *Yuma Shiraishi, Victor Co. of Japan*

"AVA Developments," *Gerry Engbretson, Ampex*

"A Disc Recorder for HDTV," *Tateo Toyama et al., Sanyo, and Yuichi Ninomiya et al., NHK*

"The CCD Broadcast Camera,"

Thomas Gurley, RCA

"A Possible Digital VTR for HDTV,"

Yoshizumi Eto, Hitachi

"Super Slo-Mo System," *Larry Thorpe, Sony Broadcast*

"Major Parameters in HDTV," *Tetsuo Mitsuhashi, NHK*

"Enhanced Television—A Progressive Experience," *John L. E. Baldwin, Independent Broadcasting Authority*

"HDTV: Progressive or Interlaced,"

Kerns H. Powers, RCA

Saturday Afternoon:

Stereo Audio in Television

"Stereo Audio in TV—Tutorial," *Thomas B. Keller, NAB*

"Stereo Audio Encoding for TV," *Leslie Tyler and Bill Allen, DBX*

"Experience with Stereo Audio in TV Broadcasting," *C. Robert Paulson, AVP Communications*

"Digital Stereo Audio," *Howard Jones, BBC*

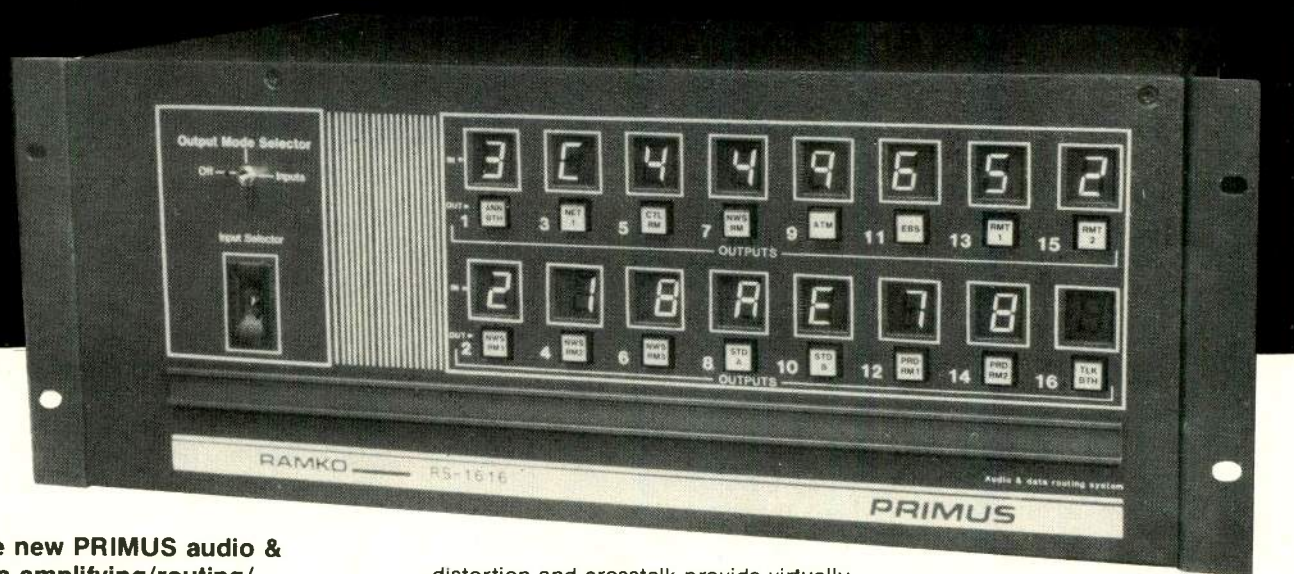
"Digital Stereo Audio in the DVTR," *Kenneth Davies, CBC*

"Stereo Audio Television Reviewed," *Carl G. Eilers, Zenith Radio*

"HDTV—A Progress Report," *Richard Stumpf, Universal City Studios*

"An Audio Time-Base Corrector," *Thomas Rosback, Harris Corp.*

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tently crisp, clean performance. Reel after reel. Generation after generation. Even under the pressures of heavy editing and multiple generation dubbing.

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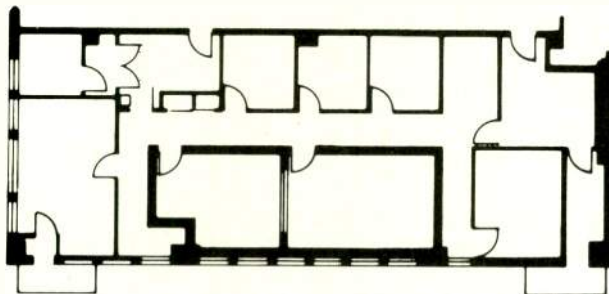
mote control system on the market.

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SELECTING AN INTERCOM SYSTEM

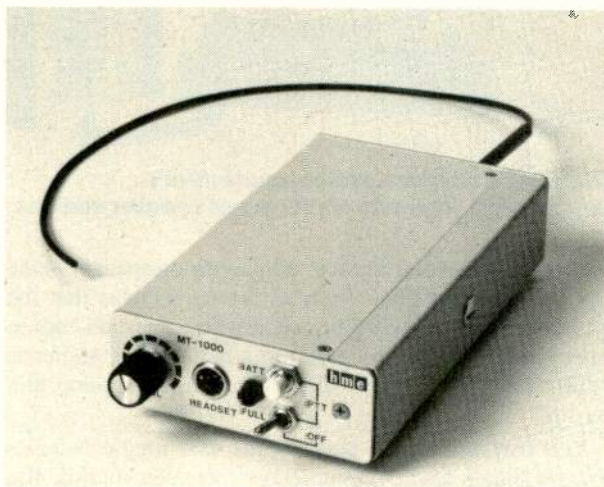
BY JOHN SHEPLER

Any production involving more than a single person has potential communications problems. Consider a radio production in which an air personality and a newscaster work together. Chances are the two work from separate studios and perhaps even have their own dedicated control board operators. Events probably flow smoothly most of the time—until a fast-breaking story causes the normal programming to be interrupted. At that point the station can have problems with studio connections, taped actualities, remote pickups, commercial rescheduling, and music timing. A lot of frantic arm waving and hastily scribbled notes could be replaced by a simple interstudio intercom.

Now consider a typical television newscast. In addition to the personalities on-camera for news, weather, and sports, there are a host of support people involved in the production. Camera operators and floor directors are in the studio. Directors, switchers, producers, and others are in the control room upstairs. An announcer may be isolated in a small booth with no visual contact at all. Somehow, all of these people have to know exactly what to do and when to do it. They also have to be ready to go to live remote feeds or to handle new stories at a moment's notice. It might take a fairly sophisticated hands-free intercom to adequately coordinate these events.

Taped broadcasts and remote productions can be even more demanding than a live news show. Production time and talent are expensive. The recording location could be unfamiliar and full of visual obstacles. Large events such as sports tournaments and elections will require voice

communication over wide areas with little chance for visual cueing. A wireless system may be needed to accommodate sites that cannot be wired for cameras, microphones, or intercoms.

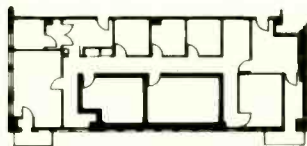


HME's MT 1000 wireless intercom belt-pack.

TYPES OF INTERCOMS

The simplest intercom is the familiar push-to-talk "squawk box." This consists of two stations: one has a lever or pushbutton and a loudspeaker that also works in reverse as a microphone; the other station has only a combination loudspeaker/microphone. The master station may call the slave station by using its speaker as a dynamic microphone to drive a low-power audio amplifier connected to the slave speaker. Toggling the switch to the "listen" position alternates the amplifier

John Shepler is a technical consultant and writer living in Rockford, IL. He was formerly chief engineer of radio station WROK/WROZ and has been working in the broadcast industry for over 17 years.



FACILITIES DESIGN AND ENGINEERING

connections and allows the slave to be the transmitter and the master to be the receiver.

A slightly more complicated arrangement gives each station an amplifier and a switch, so that either station can be the master and originate the conversation. However, the station is still on a push-to-talk basis. Push-to-talk (PTT) means you have to hold down a button to talk. Otherwise, your conversation will not be transmitted.

Such systems are referred to as half-duplexes. Both parties can speak, but only one at a time. What if each station had a separate microphone and loudspeaker? Now, both stations could talk and listen at the same time. This is referred to as a full-duplex connection. In a PTT system, both parties have to push their talk buttons to carry on a full duplex telephone-like conversation.

A simple push-to-talk full-duplex intercom is superb for communication between radio studios. You can make the arrangement easy to use by bridging the studio microphone preamp to get the talk signal. This can be connected to the cueing amplifier and speaker in the other studio's control board, or it can be routed to an external amplifier and ceiling speaker. Pushbuttons can route the



The Telex Audiocom system consists of a switchboard, intercom stations, and speaker stations.

mic signal to several studios, or to a paging speaker in the hall. A side benefit of such an arrangement is that the announcer can be on the air and still direct certain cues to other studios simply by pressing a button. The audience would not even know that the intercom connection existed.

You can replace the pushbuttons with toggle switches and get hands-free communication between studios. But beware of feedback. If the volume is not kept fairly low, the signal will go from speaker to microphone in each studio and set up a pretty good squeal.

If you want true hands-free two-way communication, you need an arrangement like a speaker-telephone at both ends of the conversation. Some hands-free phones use a voice switch to alternate between talk and listen. Your phone is actually in only one of the two modes at a time. Consequently, if both parties talk at once, someone gets cut off.

A better arrangement is the hybrid or two-wire/four-wire interface. A hybrid transformer or electronic equivalent cancels the talking or send audio out of the listening or receive audio. Once balanced, feedback is eliminated and



Cetec Vega QX-2 and QT-1 wireless intercoms.

both parties can talk and listen at the same time. One hybrid circuit is needed for each intercom station.

The electronic hybrid is an example of a cabled duplex system. Such a system can include many stations. Each station is connected across a common cable, which is often just a single pair of wires. If the loudspeaker and microphone are replaced by an operator's headset, the hybrid balance can be adjusted so that a small amount of the talk audio will bleed into the listen circuit. This allows the people in the system to hear their own voices to confirm that their stations are functioning. The amount of bleedthrough is called sidetone and is often adjustable.

WIRELESS INTERCOMS

Sometimes, a wired intercom is just not practical. You don't always have a good place to run the cable where it will be safe from accidental or deliberate disconnect. There may not be time to run the wires before the broadcast, or the owner of the location may take a dim view of your snaking cables through ductwork and up and down stairs. Then again, you may just desire a freedom of movement that wiring doesn't allow. A wireless intercom is the answer to these problems.

The simplest wireless intercom is the familiar walkie-talkie. Walkie-talkies are push-to-talk equivalents of the wired half-duplex system. These give a good range and are easily carried. If the pushbutton switch is a problem, a VOX or voice-operated switch and headset will give hands-free one-at-a-time communication.

A better system is the full duplex wireless intercom, which allows you to talk and listen at the same time without annoying switching noises or dangling cables. This is the closest thing to being right next to the person you are conversing with. The ease of communication allows you to forget about the intercom and concentrate on the show. Of course, wireless systems are considerably more expensive than wired systems and might also be subject to dropouts or interference problems.

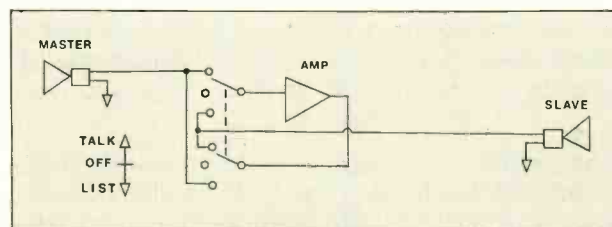


Figure 1. A simple PTT squawk box.

We helped KHBS-TV eliminate antenna maintenance with this WavestarTM UHF antenna

KHBS-TV, Fort Smith, Arkansas can expect its new WavestarTM slotted waveguide antenna to keep on transmitting—trouble-free—well into the 21st Century. The secret is simplicity. With waveguide there's no center conductor. No bullets. No insulators. Fewer parts for fewer problems.

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

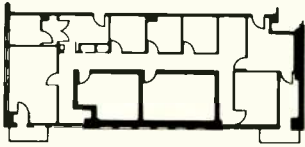
That's why another station, WTIC-TV, Hartford, Connecticut is using its new omni-directional Wavestar with a channel 61 240 kilowatt Harris transmitter, without fear of antenna burn-out.

If you want to control maintenance costs, increase safety margins and maximize performance, you want a Harris Wavestar slotted waveguide UHF antenna. Contact Harris Corporation, Broadcast Transmission Division, P.O. Box 4290, Quincy, Illinois 62305. 217/222-8200.



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DESIGNING A CABLED INTERCOM SYSTEM

The least expensive professional intercom suitable for most television and theatrical production work is the cabled duplex system. It allows many stations to be active on the same cable so that if anyone speaks, everyone else hears what is said.



R-Columbia's TR-50 wireless intercom headphones.

Each person has a headset, which is a single or double headphone and a boom microphone. These are connected to a belt pack, which contains the amplifier electronics for the microphone and headphone, and the appropriate connectors. The belt packs are powered by an external power supply which converts 115- or 230-volt ac power to the 24 to 28 volts of dc power needed for the pack electronics. The power supply drives one end of the cable that links all of the belt packs and provides an audio termination of, typically, 200 ohms for the system. A loudspeaker station may also be included at a fixed location for paging or cues.

The interconnecting cable is generally a standard three-wire shielded audio cable compatible with XLR-type audio connectors. The cable can be configured as a two-

wire system with one conductor common and the other carrying both dc and audio. The other common configuration is called three-wire, and has separate conductors for common, audio, and dc.

A more obscure configuration uses four wires and balanced transformers to provide separate balanced pairs for talk and listen. The dc power is derived from center tap connections on the transformers. Such a scheme is also popular with many electromechanical transmitter remote-control units.

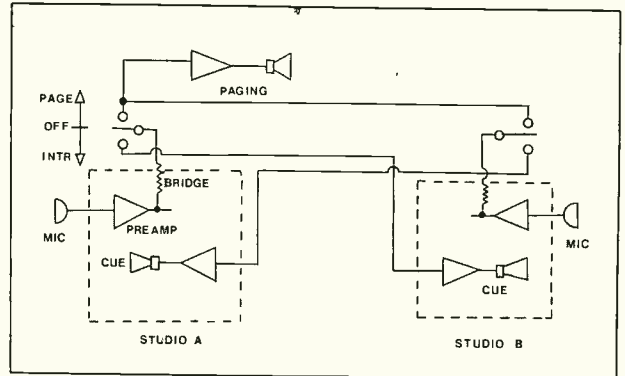


Figure 2. A simple interstudio intercom with page.

In a cabled system, all remote stations bridge a common cable for power, signaling, and audio. This is called a party-line circuit. All headphones are active all the time. The belt pack contains pushbuttons to activate the boom microphone and a signaling lamp on the other remote stations. The microphone is push-to-talk. This eliminates the ambient noise that would occur if all microphones were active at the same time. However, the system is full duplex because two or more stations can activate their microphones and carry on a telephone-type conversation.

The most common system design is the single-circuit system, which has all stations on one party line. However, several party lines may be established from a common power station. Such power stations contain the necessary power supplies for each party line and switching circuits, so that the separate circuits may be combined if desired.

The reason for having several party lines is to group the users by function. For instance, you may want to have one circuit for all sound personnel and an independent circuit for lighting personnel. If the two groups need common direction, the circuits can be tied together at the power station. The director can be located at the power station and have control of all communications.

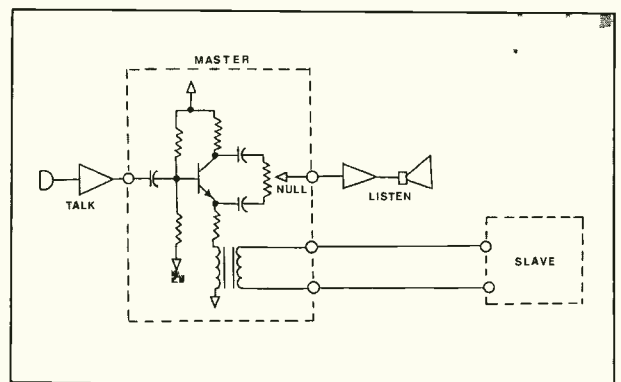


Figure 3. An electronic hybrid circuit for full duplex intercom.

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ROB DALTON, PRESIDENT AND GENERAL MANAGER, KAKE-TV, WICHITA



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There's more to than meets

Producing effective multichannel sound isn't easy. Though the procedures borrow heavily from recording studio and film sound techniques, audio for video is a specialist art with a unique set of requirements.

As its early practitioners have discovered, the inherently complex process of stereo teleproduction and post-production can be made even more difficult by cobbling together a collection of modified equipment in the hope of serving these advanced needs.

While makeshift arrangements may satisfy the technical minimums of the task, they introduce tradeoffs in operational flexibility and efficiency which can ultimately affect both production quality and costs.

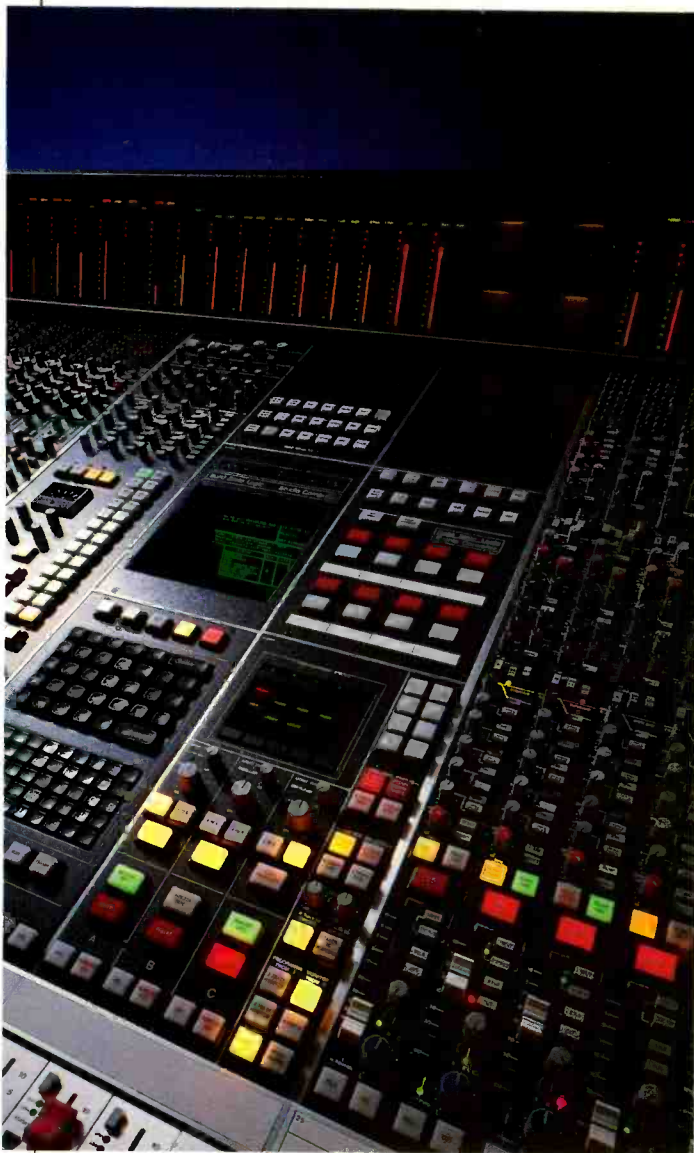
Fortunately there is an alternative, developed for the leading post-production houses and refined in collaboration with major broadcast organizations throughout the world: The SL 6000 E Series Stereo Video System from Solid State Logic.

SSL Puts it all Together

The SL 6000 E Series is a thoroughly integrated system designed specifically for the stereo video environment. Combining the most advanced aspects of multitrack, motion picture and broadcast audio technology, it provides extensive signal processing, routing and mixing capabilities as well as comprehensive machine control and communications—all commanded by a single operator at a logical, unified control panel.

SSL's multichannel mix matrix allows separate stereo music, effects and dialogue mixes to be created at the same time as the stereo program mix. In live production, multiple stereo splits or mix-minuses can be structured at the touch of a button. Mono composites of each mix are always available, and a mono programme feed is provided. Advanced formats such as stereo plus a secondary audio programme or centre-channel dialogue are also supported.

Changeover between live and post-production modes and different output configurations is instantaneous. The rigid architecture of ordinary consoles is replaced with patchfree audio subgrouping and pushbutton signal processor routing, allowing the engineer to customise the signal flow for each project.



Stereo Television the eye.

Meticulous electronic design creates the shortest signal path for each requested function, allowing SSL to maintain a dynamic range and bandwidth that far exceeds the performance of even the best 16-bit digital recorders, converters and routing switchers.

Complete Machine Control



The SSL Stereo Video System also provides the operator with central control of up to five synchronised audio, video and film transports. Cue points are stored and called by timecode, foot/frames or key words.

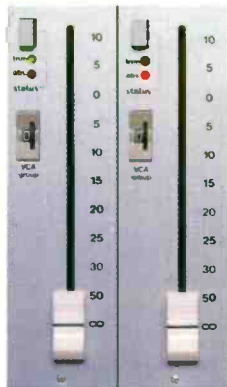
The SSL Studio Computer provides complete list management with floppy disk storage, video display and hardcopy printouts. Distributed processors ensure rapid search and lock-up. There's even a Sync Preset function which automatically calculates offset values between reels and stores these for subsequent setups.

Dynamic Mixing Automation

The machine control functions are integrated with SSL's audio mixing software to provide powerful, versatile and efficient assistance. Engineers can retain their existing mixing methods, or supplement them with simple yet powerful new routines that allow unlimited frame-accurate mix revisions to be performed with outstanding results and uncanny speed.

SSL's computer assisted rollback and pickup recording enables mixes to be assembled within the automation itself, using traditional techniques. Video layback can then take place in a single first-generation pass, directly from the multitrack!

Beyond fader automation, the SSL System optionally provides programmable parametric equalisation, dynamic stereo panning, and multiple Events Control of up to 32 external devices — each with its own pre-roll memory.



Total Recall™

SSL's Total Recall computer records the settings of every control on each I/O module. A high resolution display of the stored values interacts with the console, allowing fully detailed setups to be restored to a control accuracy of a quarter dB. Total Recall greatly reduces setup time, maximising productivity and creative continuity.



Stereo Perspectives

Not all stereo channels were designed to serve video requirements. Only SSL provides parametric stereo EQ, filters, compressors, gates and expanders on stereo inputs as standard, along with image width and stereo reverse controls. There is no easier or more effective way to match music, ambience and effects perspectives with television images.



Get the Full Picture

As you can see, there is a lot more to producing stereo television than meets the eye. To help you get the full picture, Solid State Logic has published a forty-page colour booklet which thoroughly explains the functions, applications and operation of the SL 6000 E. If you are involved in television production, outside broadcast, video post-production or music video, we'd like to send you a copy. Just drop us a line or give us a call.

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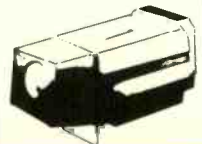
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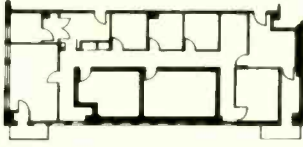
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for half-duplex (push-to-talk) operation or may be switched to full duplex, which provides continuous hands-free transmission and reception. A headphone level pot and battery status indicator are included. With nine-volt alkaline batteries, the belt packs may operate continuously for eight to 10 hours.

More than four wireless belt packs may be easily accommodated by adding packs and base stations with additional channels, or by letting several belt packs use the same transmit frequency. In this case, push-to-talk is mandatory because only one signal can be transmitted without interference at a given time. Wired stations, generally used at fixed positions for cameras and lights, are the most cost effective. But the director or assistants may desire wireless stations for mobility. Wireless stations are also needed for positions that are not practical to wire.

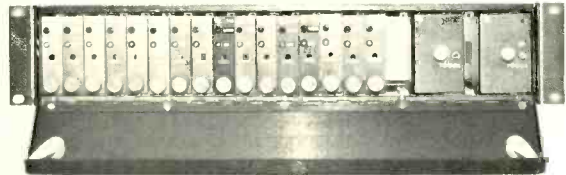
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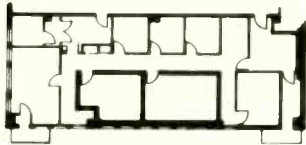
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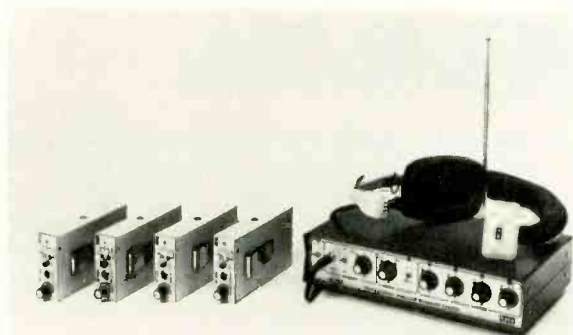
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If your needs are more complicated, however, the only way to go is with the professional headset-based wired and wireless intercom systems. The manufacturers of these systems offer modules that allow you to start small and expand to meet changing needs. It is easy to add stations to either a wired or wireless system without sacrificing voice quality or versatility.

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The HME IC-150 wireless intercom station.

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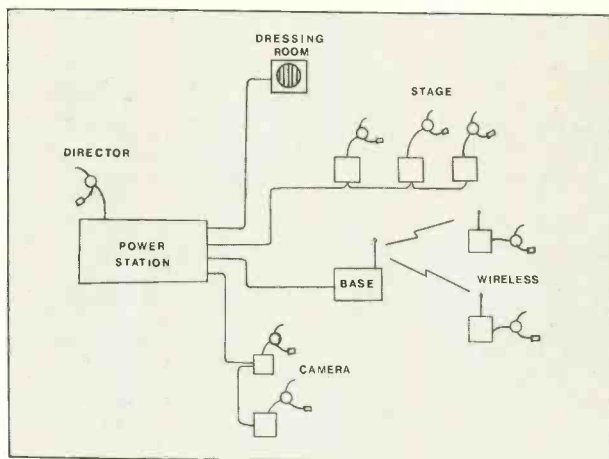


Figure 4. Total cabled/wireless intercom system.

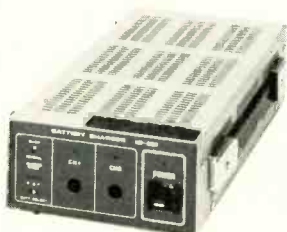
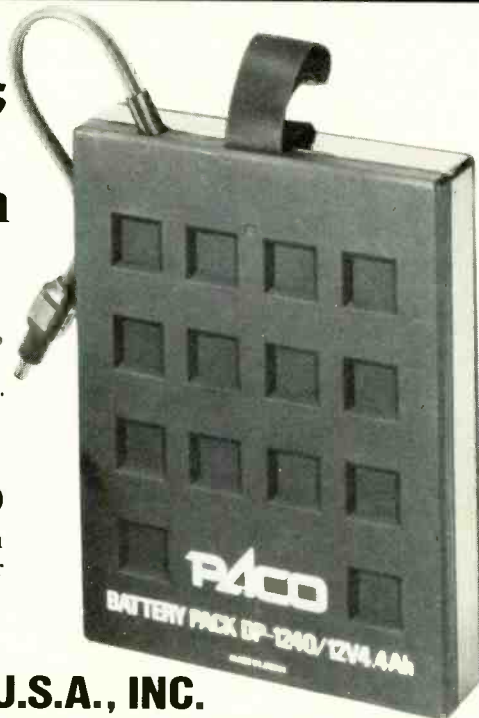
Before choosing any system, be sure you consider functions, construction, and future needs as well as cost. If possible, bring along a few people who will be using the system, and visit a working installation as well. Some hands-on experience will give you the best idea of how the system will work in an actual production. **BM/E**

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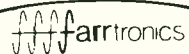
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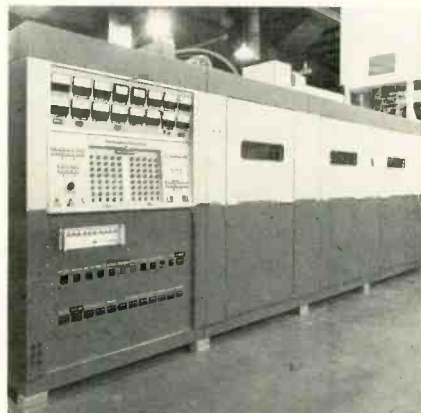
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Top: 2,000,000 watt transmitter during factory test; Top right: low power AM and FM transmitters during final assembly and test; Bottom right: 250,000 watt SW transmitter.

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interpreting the **FCC** rules & regulations

Remote-Control Rules Are Relaxed

By Harry Cole, FCC Counsel

As 1984 slowly grinded to a halt, you may have missed a couple of relatively mundane rule changes which could affect your day-to-day (or, perhaps more appropriately, night-to-night) operation—especially if you operate a Class III or Class IV AM station. The changes, which affect remote-control operation of all types of stations and nighttime (or post-sunset) operations of certain AM stations, may not seem all that impressive at first glance. They should, however, be very welcome by those in a position to reap their benefits.

In late November 1984 the remote-control rules felt the touch of the magic deregulation wand. Those rules used to, and still do, require that each station have an operator on duty and in control of the transmitter at all times. This is required by the Communications Act and has not been changed. The rules used to require that each station have equipment permitting the operator on duty to determine operating power and other transmitter conditions and make certain adjustments. They also required that the remote-control point be inaccessible to unauthorized personnel and that it be designed to preclude the transmitter from getting turned on inadvertently. Further, whenever the control or metering circuits between the transmitter and the remote-control point are "disrupted" or "do not function correctly," the rules required that the station have an operator actually "babysit" the transmitter at the transmitter site, in order to assure proper operation.

The old rules have now been overhauled with an eye to streamlining them and making them more consistent with currently available equipment and technology. After all, the old rules were developed at a time when the state of the broadcast art was not what it is today. Back then, equipment was not as reliable as today's, and as a result a much greater degree of attention had to be paid to it. A good illustration of this is that operating logs used to require detailed readings and log entries every three hours. Nowadays, however, transmitters are designed to operate consistently over long periods of time without the need for constant attention. Thus, the concern underlying the old rules has been diluted, if not eliminated.

Rules cutback

With these factors in mind, the Commission has cut its remote-control rules back to the barebones minimum. Gone are all "how to" or methodology provisions which dictated to the licensee the kind of equipment to have and the way it should be used. In their place is a general set of obligations placing on the licensee the responsibility for assuring operation in compliance with the station's li-

cence. Such licensees must have "sufficient control and operating parameter monitoring capability" to assure such compliance. Access to the equipment must be limited so that the transmitter can be activated and controlled only by authorized operators. Calibration of the equipment need only be done "as often as necessary to ensure proper operation." And the remote-control system must be designed so that the transmitter can't get activated, or have its operating mode or output power changed "inadvertently." Further, the new rules provide that if a station loses its remote metering capability, it can continue to operate by remote-control for up to three hours unless the licensee determines that the station is operating outside of its licensed parameters, in which event it must shut down right away. In any event, if the remote metering is down for more than three hours, the station must shut down. And finally, whenever a remote-control point is established at some point other than the transmitter or the main studio, the licensee must still notify the Commission within three days of the first use of that point—unless "responsible station personnel" can be contacted at the transmitter or studio "during hours of operation when the remote-control operator is elsewhere."

While directional AM stations do enjoy the benefits of these relaxed rules, there's still a catch for them. FM, TV, and nondirectional AM stations can operate under these new rules without additional authorization from the Commission. AM directionals, however, still have to get a separate Commission okay before they can go ahead with remote-control. The nature of such directional stations is such that the Commission appears to still be nervous about the possibility of interference. Accordingly, they must still provide approved sampling systems or make other appropriate arrangements and have the Commission sign off on them before beginning operation.

As with all deregulatory measures, the relaxation of the remote-control rules can be a two-edged sword. While it eliminates some of the picky little annoyances which used to litter the Commission's rules, it also creates a somewhat broader, if subtler, obligation for licensees. Broadcasters will now have to set up their own standards for assuring compliance with the terms of their licenses, and those standards may be second-guessed by the Commission. Further, the seductive simplicity of the new rules may gull some licensees into assuming that their own less than state of the art transmission equipment is good enough to get them by. In other words, while the rules have changed, that does not mean that faulty or inadequate equipment is now adequate. Actually, quite the contrary is true: given their newly articulated obligation to assure proper operation of their stations, broadcasters

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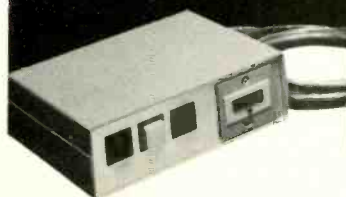
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should probably be more, rather than less, careful in checking out the performance of all aspects of their transmission systems, including their remote-control capacity.

AM and nighttime

With respect to other changes affecting AM stations, it appears that the nighttime is the right time, and vice versa. After waging a battle that extended over more than a decade, Class IV operators finally got the go-ahead in December to increase their nighttime power to the level of their daytime power. The prospect for this fourfold nighttime power increase first arose almost a year ago, when the Commission, in March, 1984, adopted new rules authorizing the increase. However, those rules could not be made effective until international negotiations and coordination with Canada and Mexico were completed. Once those were wrapped up in late 1984, the Commission made its new power limits effective as of the middle of December.

In a similar vein the Commission handed Class III daytime-only AM stations a few year-end treats as well. You may recall the famous "post-sunset" operation question, where daytimers were authorized to operate for a brief period of time after sunset, but at very low power. Many daytime-only licensees who may have had in mind some significant nighttime operation came away disappointed at the miserly way in which the Commission doled out its nighttime power limits. And what do disappointed licensees usually do? That's right, they file for reconsideration—which is just what the Daytime Broadcasters Association did on behalf of Class III daytime-only licensees. The DBA objected to the power limitation of 500 watts imposed on Class III operators. That limitation was imposed by the Commission in an effort to avoid interference as a result of the post-sunset operation. In the DBA's view the new rules were "excessively technical" and "imposed excessive restrictions." Into the fray leapt the Association for Broadcast Engineering Standards, which sided for existing full-time stations and which, not surprisingly, argued that the Commission's newly adopted limitations "made generous provision for the needs of daytime-only stations."

The dust settled in December, 1984, when the Commission announced that DBA and ABES had reached agreement on the proper standards and limits, and that the Commission agreed with the compromise they had struck. Essentially, Class III daytimers will still be required to protect domestic full-time Class III stations after 6:00 p.m. local time. Between sunset and 6:00 p.m., however, the required protection will be calculated somewhat differently. For the first half-hour of post-sunset operation, protection will be calculated "at sunset plus 30 minutes" at the site of the daytimer; for the next half-hour it will be calculated "at sunset plus one hour" at the same site; for the second hour it will be calculated "at sunset plus two hours."

Increased interference

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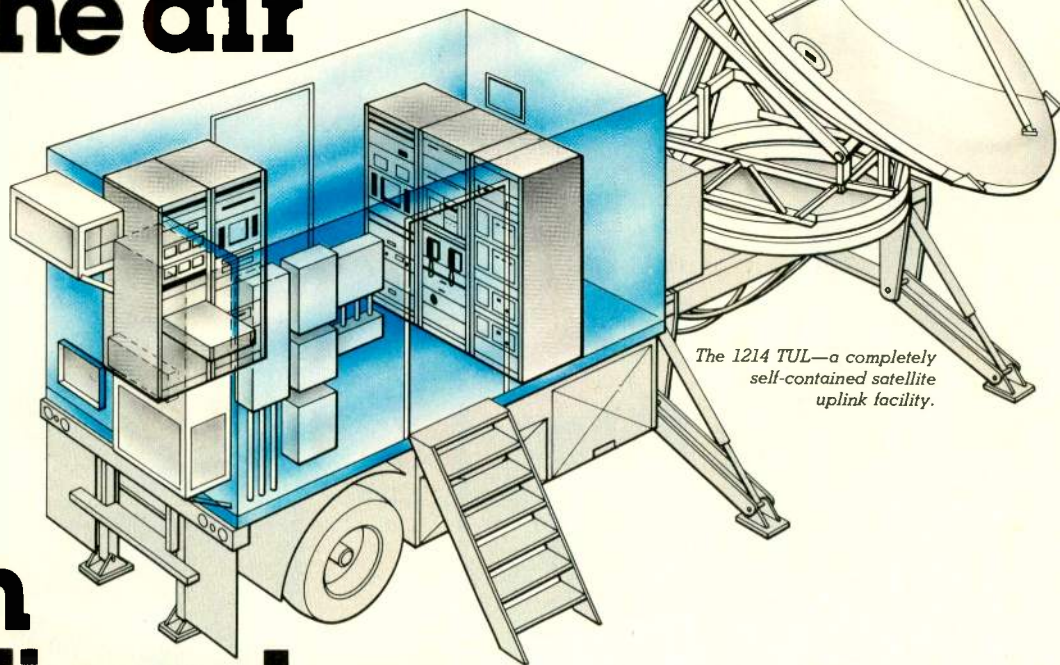
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simply a way of taking into account the fact that the potential for interference increases during the period immediately following sunset. If you really want to know, this is because the ozone layer in the ionosphere, which is "boiled off" during the day as a result of radiation from the sun, reappears once the sun sets. This ozone layer then acts as a shield which reflects AM radio signals back to earth. This reflection phenomenon can cause signals to land back on earth many miles from their point of origin, which in turn can cause interference to stations operating in the area where the reflected signal lands. Thus, during the period right around sunset the possibility of creating interference increases markedly, and the Commission believes it appropriate to tailor its rules to provide a "sliding scale" of power limits throughout the two-hour period around sunset.

Given the changing atmospheric state around sunset, the Commission had a problem. Obviously it had to tell daytimers what their post-sunset powers should be, so it had to establish some basis for calculating permissible limits. But daytimers would benefit if the calculations were made on the basis of the earliest time after sunset—since that would tend to give them greater power because potential interference would be least at that point. By contrast, full-timers would more likely prefer that the calculations be based on the latest time after sunset, since daytimers' power would at that point be least, with less potential for interference. This was clearly not an easy question, and not one that the Commission was ready to jump into. Fortunately for the Commission, the ABES and the DBA were able to bridge that gap, striking the compromise described above, which basically splits the difference. Additionally, the Commission agreed to a generous "rounding up" of power values, so that power calculated between 1 W and 45 W would be rounded up to 50 W, power from 45 W to 70 W up to 75 W, and power from 70 to 100 W up to 100 W.

The Commission's deregulatory attitude has made it quite accommodating. Class III and IV AM stations entitled to power increases as a result of these changes were essentially permitted to sit back and let the Commission do all the work. Affected licensees were notified by the Commission of the changes in their authorizations, and were permitted to take advantage of them right away. If you think that you are entitled to some increase under these changes, but have not heard from the Commission about them, you should contact your communications counsel.

As the Commission enters the fifth year of its deregulatory program, it appears to be hitting its stride. It has demonstrated an increasing ability to adopt and implement fairly significant changes with a minimum of fuss. And, possibly more significant, it is beginning to rely on private groups, such as the ABES and DBA, to assist it in the formulation of acceptable and workable standards. If deregulation is really going to work, it will only be through the joint efforts of the private and governmental sectors. The Commission has obviously started down that path.

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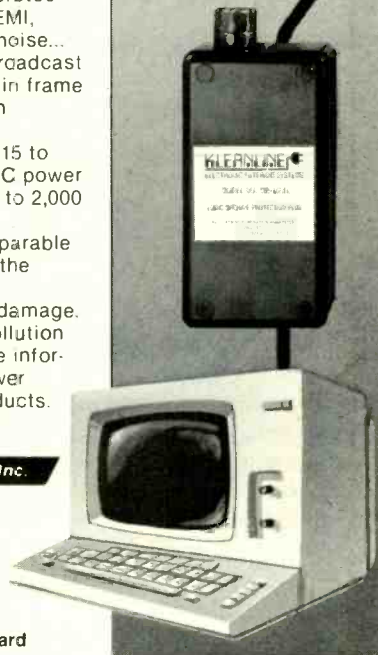
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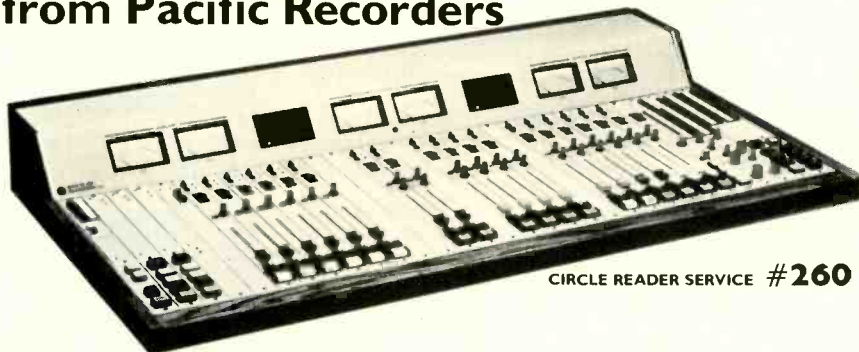
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broadcast EQUIPMENT

New Three Series Radio Console from Pacific Recorders



CIRCLE READER SERVICE #260

Pacific Recorders has announced a new Three Series version of its BMX on-air radio console. The new BMX III features three main stereo mix buses (each with distribution line amplifiers), two telephone mix-minus feeds with a monitor mix, and monitor facilities for two separate studios. Independent outputs for the console, host, cohost, and guest headphone feeds are provided, as well as a stereo cue system with automatic headphone monitor switching.

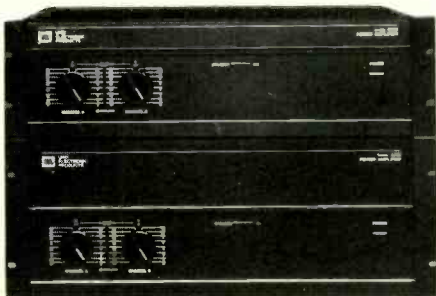
Each input of the modular console (mic or line) has full and independent remote-control logic. Audio and logic interconnection are fully compatible

with the new AMX and ABX operations and production consoles from PR&E.

The new console also features multifunction metering with automatic cue and solo level display, a voice slating system with ID tone, and a built-in, multifrequency, low-distortion test oscillator. Mainframe sizes range from 10 to 34 inputs (larger on special order). All models are fully prewired for present and future I/O, patch points, and logic. Options include the addition of two effects/foldback send mix buses, and a stereo effects/reverb return—both with remote-control logic.

JBL Introduces Two Power Amplifiers

The 6230 is a 300-watt amplifier, and the 6260 is a 600-watt amp. They use multiple 200-watt output devices in



CIRCLE READER SERVICE #261

complementary configuration for high reliability and low distortion. At rated power into eight ohms, these output devices operate at less than 25 percent of their rated power dissipation.

Whether sound is being amplified in a control room or an auditorium, the 6230 and 6260 keep transient intermodulation (TIM) distortion to less than 0.03 percent by the DIM 100 test. These amplifiers optimize each stage, allowing high slew rate and relatively low loop gain. Overall feedback has been held to a minimum and is employed only to stabilize the gain and the operating point.

To ensure failsafe operation, current is limited under improper load or drive conditions. An output relay protects the loudspeaker load under conditions of dc offset or large, low-frequency transients. The relay also provides power-up, power-down, and brownout muting to protect loudspeakers from ac power transients generated in the signal path. Rear-panel switching allows the amplifiers to operate in the normal stereophonic mode, dual monophonic mode, or bridged monophonic mode.

Tektronix Announces Dc Inverter

Tektronix has introduced a compact dc inverter, the Model 1107, for use with its 2000 Series of portable oscilloscopes. The new power source permits operation of virtually any 2000 Series instrument from an external dc source such as the Tektronix 1106 battery pack, or other compatible batteries or generators.



CIRCLE READER SERVICE #262

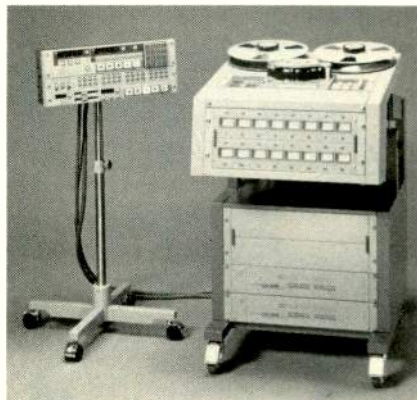
The 1107 is a standalone product that can be easily attached to the rear of any 2000 Series instrument using one of three hardware kits. When removed, the oscilloscope can be operated normally from conventional power sources with the attaching hardware still in place.

The inverter features automatic voltage sensing, selecting the appropriate operating mode for either 12- or 24-volt dc input. Measuring 3x5x11 inches and weighing only 3.5 pounds, the inverter is truly portable. When assembled, the entire scope-1107-battery pack assembly can be carried easily by the oscilloscope handle. Priced at \$950, the 1107 is available immediately.

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

Tascam Unveils New Recorder/Reproducer

Tascam has introduced the MS-16 one-inch format 16-track recorder/reproducer with remoteable meter panel. Features include rear-panel SMPTE connector with TTL logic lines for interfacing with most popular controllers; transport strong enough to handle SMPTE interlock or other unusually tough assignments; and a full three-motor servo system for positive tape tension control throughout quick lockups and stops.



CIRCLE READER SERVICE #264

The MS-16 has a base plate made of 5052-S aircraft aluminum alloy for maximum rigidity and repeatably excellent performance. A console is available that allows positioning the meter panel in front or overhead. Hyperbolic head geometry with micro-radii means "head bumps" can be reduced to less than 1 dB. There is no need to switch to repro head (except during alignment), because the record/sync head and the repro head are identical in performance.

Amplifiers are all direct coupled for lowest distortion and optimum low-frequency response. Better transient response and phase characteristics are obtained with the MS-16's first-stage sync and play-head amplifiers which use differential paired ultra-low-noise FETs. Optional accessories include a 10-point auto locator with 10-key numerical input pad, basic-function remote control, CS65 console, and a dbx unit which can be connected to the M-16's multipin connector.

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BRYSTON



Bryston's 2B-LP

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

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

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

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

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

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

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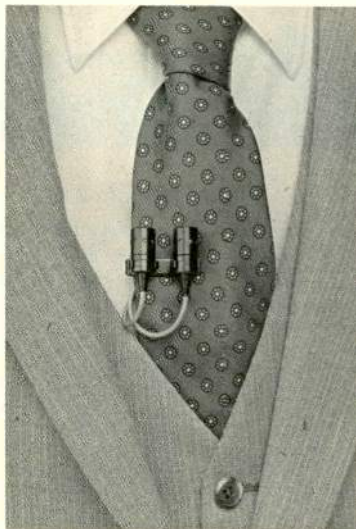
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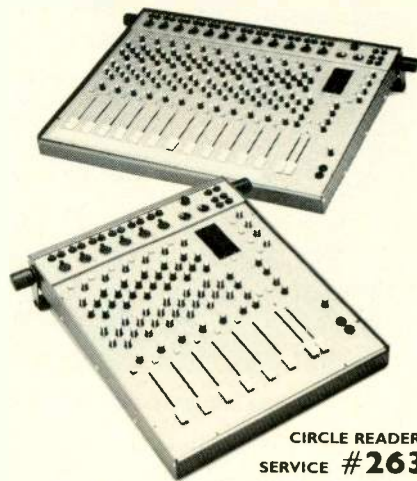
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EQUIPMENT

New Audio Mixers from Connectronics

New from Connectronics is the Seck 62 and the Seck 122, mixers that offer six or 12 input channels with two outputs in a unique, low-profile, portable package. The unit, which is fully metal encased, is only two inches deep. The rugged design is enhanced by the use of a double-sided fiberglass printed circuit board, and by the elimination of any wired connections: No wires are used; all the input and output connectors are mounted directly onto the circuit board, resulting in a high level reliability.



CIRCLE READER
SERVICE #263

The mic/line input switch on each input channel selects either a low-impedance or high-impedance input. Both are electronically balanced, and together cover a very wide range: from -55 dBm to +10 dBm, with a 25 dBm margin of overload above this. The comprehensive three-band equalization offers ± 15 dB of shelving at 45 Hz at the low end and ± 15 dB shelving at 11 kHz at the high end with ± 15 dB of sweepable control from 330 Hz to 6.5 kHz in the mid range.

Each channel has two prefade auxiliary sends for monitoring, foldback, or special effects, and two post-fade sends to feed effects or for specialized house P.A. or recording. In addition, each channel has a pre-EQ insert point for extra limiting, delay, and so forth on any individual input. A solo switch is provided on all the inputs, the four master auxiliary sends, and the auxiliary returns.

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

BROADCAST EQUIPMENT

Schwem Introduces Zoom Lens

Schwem Technology has announced a new stabilized camera lens, the Gyrozoom 60/300. The compact, microprocessor-based lens fits the lens flange of most portable ENG cameras.

The Gyrozoom stabilizes the image internally, instead of utilizing bulky external apparatus. It eliminates all high-frequency vibration resulting from planes, helicopters, cars, boats, and other vehicles, as well as platform vibration.

Weighing about six pounds, the lens is easy to use and requires no special training. It has a zoom capability ran-



CIRCLE READER SERVICE #265

ging from 60 to 300 mm. Housed in a durable case, the lens is available with an optional shoulder brace and a shock-mounted carrying case.

Studio Monitors Introduced by TOA



CIRCLE READER SERVICE #266

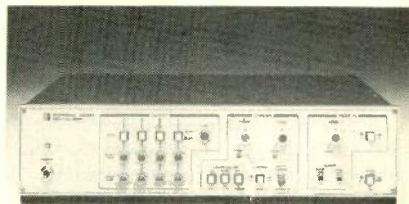
TOA's new eight-ohm speaker series, the ME Series, is designed for studios and control rooms. The top-of-the-line 312-ME is a three-way system that handles continuous program at 135 RMS. The front panel provides two

convenient level controls, one for high frequencies and one for mid-frequencies; these allow you to tailor the output to specific needs or room acoustics. Designed for primary reference monitoring, the 312-ME has a frequency response of 50 Hz-20 kHz.

The 280-ME three-way monitor offers a wide frequency response (60 Hz-20 kHz), low distortion, smooth crossover, and wide dispersion. A high-frequency level control that fine-tunes the output is located on the monitor's front panel. The 280's continuous power handling is 90 watts RMS.

The two-way 265-ME is ideal for either primary or secondary reference applications. It handles continuous program at 75 watts RMS, featuring wide response (60 Hz-20 kHz), smooth crossover, and symmetrically arranged components (6.3-inch woofer, 1.2-inch soft dome tweeter with diffuser) that provides a localized sound image.

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BROADCAST EQUIPMENT

For-A Introduces Digital Time Base Corrector

The FA-400 is a new, low-cost, NTSC digital time base corrector with a full color frame memory function. The unit is compact and lightweight, and offers automatic/manual field-one and field-two freeze, and remote-control capabilities.

The FA-400 is capable of correcting errors in half-inch and 3/4-inch VCRs, or any V-lock or non-V-lock source. A full processing amplifier allows control of video level, chroma level, chroma phase, setup and freeze function. The model also includes a built-in RS-170A standard sync signal generator with genlock function. An optional remote control allows full operation away from the unit.

CIRCLE READER SERVICE #267

Lexicon Unveils Digital Delay Processor

The Lexicon Prime Time II Model 95 is a digital delay processor with dual outputs, each with digital display and separate blend and recirculation controls.



CIRCLE READER SERVICE #268

Extremely fine control of short delays results in superior flanging, double tracking, and image localization. The Prime Time II's special delay modulation and sweep function allows a broad range of sweep effects, including "talking flanges," trills, and dynamic pitch shifting for realistic doubling.

The Model 95 standard unit features long delay capabilities with 1.92 seconds as standard. Also available is the Model 95 MEO-1, with 3.84-second delay, and Model 95 MEO-2, with 7.68-second delay. Lexicon's new DRC (Dynamic Recirculation Control) and metronome features complement the Prime Time II's long delays. These allow the unit to be used as a short-term digital audio recorder to create sound-on-sound layering effects.

Prime Time II utilizes PCM (Pulse Code Modulation) encoding, which provides low distortion of 0.04 percent throughout its full power bandwidth, 90 dB dynamic range, and 20 Hz to 16 kHz audio bandwidth. The unit is \$1980 for 1.92-second delay; \$2200 for the 3.84-second unit; and \$2500 for the 7.68-second delay.

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

Video Distribution Amplifiers from Dynair

The 1500 Series is a group of distribution amplifiers designed for RGB applications. The DA-1510A 1 by 4 amplifier features wide bandwidth with low passband ripple, low differential gain and phase, and exceptional transient response. Dc servo-controlled amps with components located on a common substrate assure high thermal stability.

The PD-1515A pulse distribution amplifier is ideal for small studio, remote, mobile van, and ENG applications. The high impedance differential input accepts -2 to -4 V p-p pulses and has excellent common mode and hum rejection. Edge-triggered pulse regen-

eration produces exceptional timing and pulse width accuracy, minimizing overshoot, ringing, and tilt.

There are two equalizing amplifiers in the series. The EQ-1530A unbalanced input amplifier will equalize 3000 feet of Belden-type 8281 cable. A differential input circuit provides high rejection of common mode signals.

The Model SW-1540A 6 by 1 passive video switcher provides a simple and economical means of manually switching one of six sources to one output. A long-life interlocked pushbutton switch assembly is used with printed circuit board wiring for reliable performance. Legends can be added to each pushbutton for operator identification of sources.

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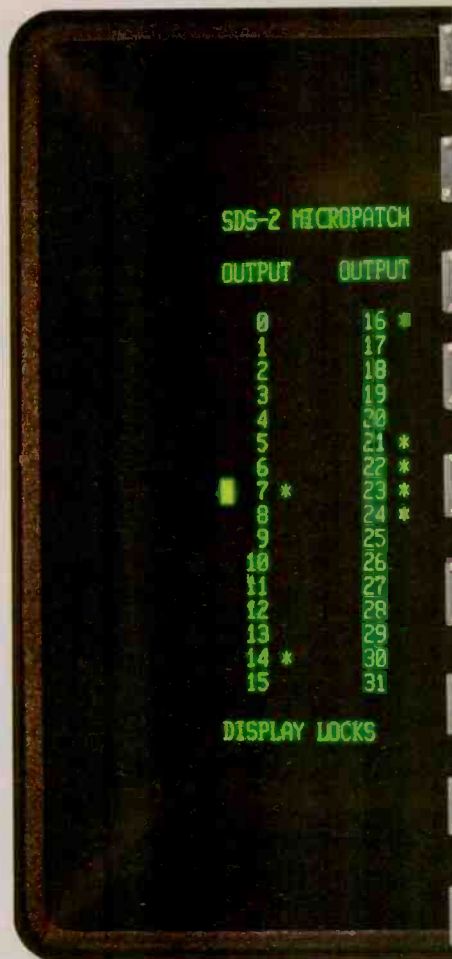
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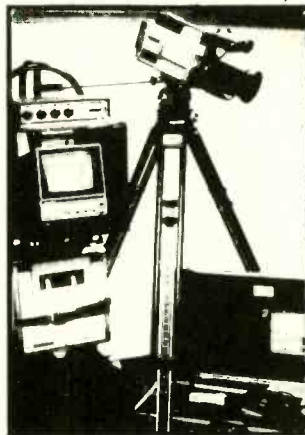
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BUSINESS BRIEFS



Ken Teaney, a mixer at KABC-TV, Los Angeles, records a 16-track tape using a Ramsa WR-8616 mixing console.

Chyron Corporation, which has a 14 percent equity investment in Digital Services Corp., plans to exercise its options to acquire an additional **37 percent interest** in the company in Fiscal 1985. Chyron also entered into several agreements with **Orrox Corp.**, and now owns approximately 39 percent of its shares. In a related item, Orrox has named Sam Goodman president and CEO, succeeding Phil Arenson As part of the restructuring of Sony Corp., president Kenji Tamiya has announced the creation of **Sony U.S. Marketing Group**, an umbrella for Sony's marketing operations and support activities. Neil Vander Dussen has been appointed president of Marketing Group, and will continue to serve as president of Sony Consumer Products Company.

Fairchild Industries has acquired Comtech Data of Scottsdale, AZ. Its new subsidiary, Fairchild Data, will become part of its Electronics & Space Group Satellite TV transmission company **Netcom** recently signed a one-year contract with CBS to provide transportable uplink facilities for a package of at least 24 major televised events Scientific-Atlanta has inked a three-year agreement with Cox Cable Communications for the sale of **3500 miles of distribution equipment**. Cox will place the equipment in 330, 450, and 550 MHz systems.

Microdyne is supplying a satellite radio distribution system to the Progressive Farmer Network based in Starkville, MS. The network began satellite distribution last month, using Westar III, Transponder 2.

WWHT-TV, Newark, NJ, is moving its facilities to the Empire State Building in New York City. The station

will operate with a custom RCA UHF Pylon Antenna and a new transmitter. Projected air date is April 1 **KMSP-TV**, Minneapolis/St. Paul recently became the first station in its market to switch to **circularly polarized broadcasting**. The station uses a 70 kW transmitting system from RCA Broadcast Systems The **USA Network** has launched stereo audio to all of its affiliates using the Wegener 1600 transmission system. *Night Flight* and *Radio 1999* will be the first programs to be broadcast in stereo In Ocala, FL, 25,000 students in Marion County schools will soon be attending classes on TV via the **Instructional Television Fixed Service (ITFS)** system. An ITFS system will also transmit on Florida's public broadcasting station, WVFT, Ch. 5 **Georgia Public Television** has been awarded a \$100,000 grant by Sony's Broadcast Division, which provides the network with two Betacam video cameras and a Betacam editing system **WCSC-TV**, the Charleston, SC CBS affiliate, has joined Minnesota-based SNG company Conus Communications In Washington, DC, a **television newsroom and satellite transmission facility** is being operated jointly by New York-based satellite services firm Newslink, and Evening News Broadcasting Company. Both firms served a number of TV stations at last summer's political conventions.

King Street Studios, San Francisco, a service of One Pass, recently opened its 30,000-square-foot facilities. . . . Component, equipment, and systems supplier M/A Com Mac has opened a new west coast facility in **Orange, CA** After five years, West German audio manufacturer **Uher Werke Munchen, GmbH**, has reopened a U.S. sales office in Los Angeles. . . . Industrial marketing production house United Media Productions has opened offices at **2700 South Ridgewood Ave., South Daytona, FL**.

Quad Eight/Westrex has been appointed the exclusive U.S. distributor of AEG-Telefunken professional tape recorders. . . . Allied Broadcast Equipment's Satellite Division is now a distributor of **Wegener Communications** satellite receiving equipment.

KRIV-TV, Houston, **WAVE-TV**,

Louisville, and **WJBK-TV**, Detroit, are among several stations that have purchased ADM Technology's 9000 Series computer-controlled stereo console **db Sound**, New York City, has installed two Neve 5106 consoles for its audio application needs **Interface Video Systems**, Washington, DC, has brought on-line its MCI/Quantel DPB 7000 computerized paint system. The DPB 7000 offers 16 million colors and 90 text fonts Massachusetts transmission company Videocom Satellite Associates has added another Dalsat **transportable earth station**.

In order to boost its stereo audio capabilities, New York City standards conversion house **Intercontinental Televideo** has added PAL VHS Stereo Hi Fi and PAL Betamax Stereo Hi Fi to its equipment roster Line One Video, New York City, says that Betacam is "**not so slowly taking over.**" It has found that 60 percent of the production coming in is shot on Sony's half-inch Betacam system. "More and more producers are turning to Betacam and liking it," says Line One's editor Roslyn Baws. . . . **Teatown Video**, New York City, has integrated the Betacam format into its CMX-340X on-line editing suite. . . . Also in New York City, **Montage** has delivered its Picture Cutter to First Edition Composite Film.

Among the personnel changes this month, Russ Smith has been named executive director of the **Broadcast Designers Association**. . . . Ray Baldock has joined **Sony** as product manager for multicassette systems At **Panasonic**, John McDonnell has been appointed product line business manager. Herman Schloss takes over as manager of field operations and sales administration.

CompuSonics has named James Woodworth national sales manager David Erikson joins **M/A-Com Mac** as manager of customer service At **Electro-Voice**, Ray Kirchhoefer has been named engineering project manager/microphones **JBL** has hired Drew Daniels, Roy Cizek, Henry Martin, and Paul Apollonio as engineers Mitch Levin has joined **Telemation Productions** as a graphic artist.

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