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# BROADCAST engineering

*The journal of broadcast technology*

**January 1984 • Volume 26 • No. 1**



**THE COVER** shows an ENG helicopter from KIRO, Seattle, WA, with the Space Needle in the background. KIRO is especially significant for this ENG/EFP/RENG special issue because its computerized newsroom operations are shared by radio and television. An article, "Newsroom Automation: New Technology at KIRO," begins on page 21. Other contributions also pinpoint the growing emphasis on technology that makes local and worldwide news coverage possible.






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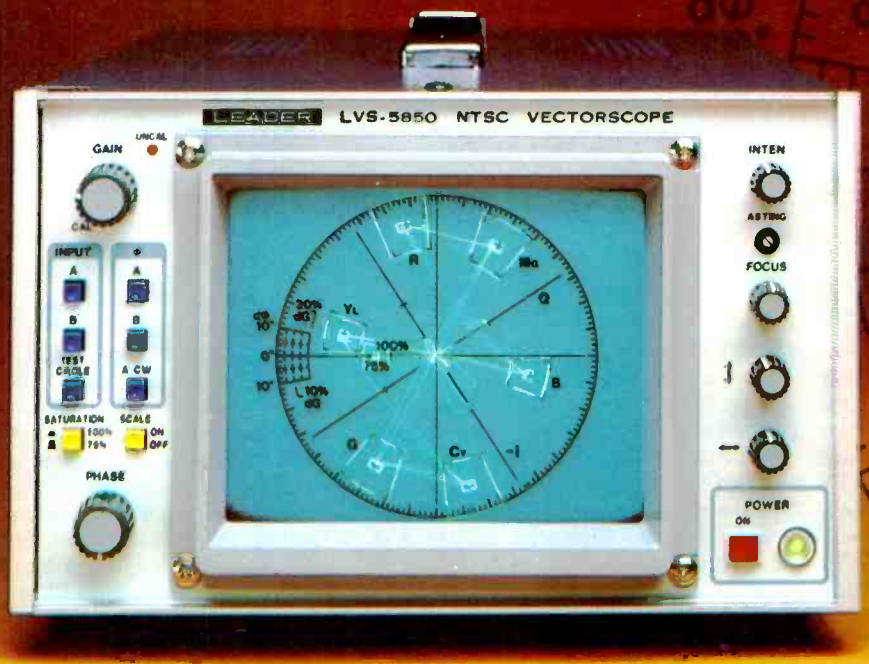


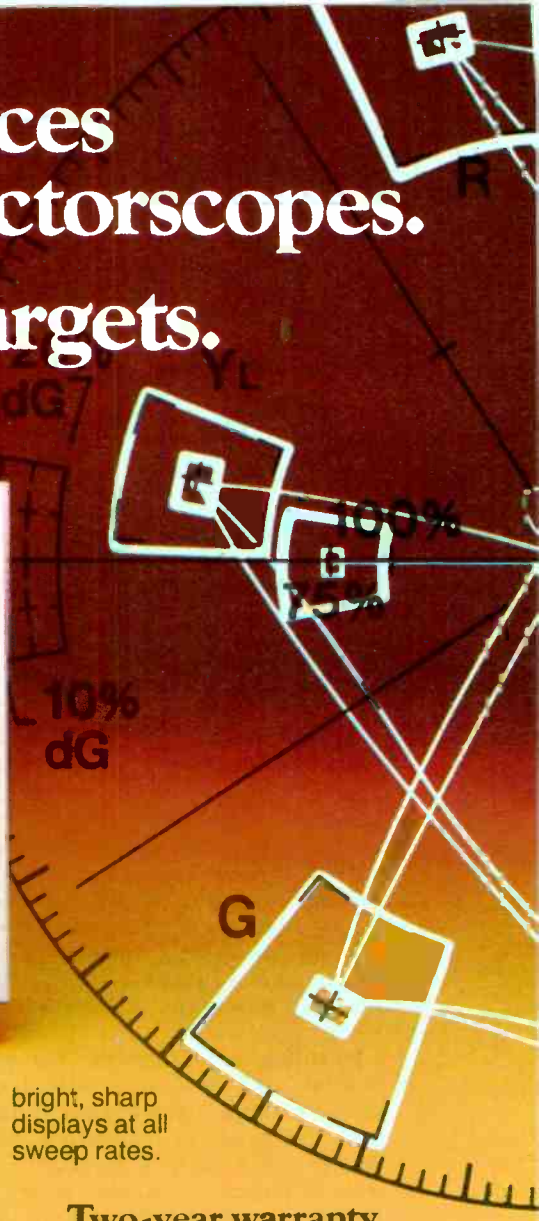


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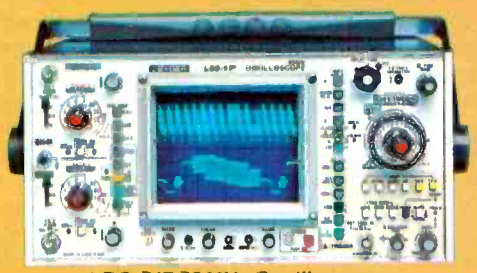

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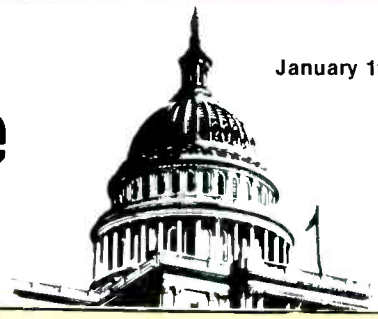
# FCC update

Harry C. Martin, partner, Reddy, Begley & Martin, Washington, DC

January 1984



### Local regulation of SMATV pre-empted

In response to a petition by a New Jersey satellite master antenna television (SMATV) operator, the FCC has ruled that state and local authorities may not regulate SMATV operations within their jurisdictions. SMATV systems normally serve apartment houses and consist of a master antenna for receiving over-the-air TV signals, plus a satellite receive station for providing premium program services.

In ruling on this matter, the commission said the signals being transmitted and the communications satellites involved in providing such signals make SMATV systems interstate in nature and subject to federal rather than local jurisdiction. The agency said state and local governments are not precluded from exercising jurisdiction over non-programming aspects of SMATV operations that may fall within their authority, such as zoning or public safety and health, as long as this exercise of authority does not interfere with signal delivery.

From a policy standpoint, the FCC concluded that state and local regulation of SMATV would "chill development" of that new medium contrary to the public interest.

### Local rate regulation of tiered CATV services pre-empted

In a related action, the FCC ruled that specialized or auxiliary cable services provided in tiers and offered to subscribers at a single additional package price are exempt from local and state rate regulation.

In making its decision, the commission said that it had pre-empted the field of pay TV cablecasting more than 10 years ago and, several years later, had specifically limited local and state rate regulation to the area of regular subscriber programming. Although tiered services had not been specifically listed in these rulings as being one of the cable TV services exempt from state regulation, this was because the practice of tiering did not become common until the late 1970s, after these decisions were made. The FCC's ruling is based on the fact that tiered services primarily are satellite-delivered and are thus of an interstate nature.

The commission's ruling negated an effort by the Nevada Public Service Commission to classify tiered services as being "regularly provided to all subscribers," a classification that would have made them subject to local rate regulation. The FCC said this interpretation is inconsistent with FCC policies that have sought to limit local regulation of satellite-delivered cable services.

### Station-sponsored debates ruled exempt from equal time requirements

The FCC has changed its interpretation of Section 315 of the Communications Act to permit the broadcast of debates between legally qualified candidates for public office, arranged and sponsored by a broadcast licensee, without triggering the equal opportunities requirements of the law. This ruling was made in response to petitions by Henry Geller, a former FCC general counsel and the chief of NTIA during the Carter administration, and by the NAB and the Radio-Television News Directors Association.

Generally, Section 315(a) of the Communications Act requires a station to afford equal opportunities, or equal time to all legally qualified candidates for a particular office once one of them has been permitted to appear on the station. Section 315(a)(4) provides an exemption to this requirement in the case of candidate appearances during "on-the-spot coverage of bona fide news events." In the past, the commission did not consider political debates sponsored by broadcasters as falling within this exception. Debates had to be sponsored by outside parties, such as the League of Women Voters, in order to qualify as bona fide news events.

The changed interpretation is justified, the commission said, because the purpose of the Section 315(a)(4) exception—to maximize broadcast coverage of political events—will be served by permitting increased broadcaster discretion in providing such coverage. On this basis, the commission said that the requested interpretations of the bona fide news event exception fully comport with the legislative history of Section 315(a)(4).

The commission declined to rule whether documentaries that focus on campaign issues with incidental but significant candidate appearances fall within a similar exemption for "bona fide news documentaries" provided for in Section 315(a)(3) of the act. The agency said it would continue its present practice of examining, on a case-by-case basis, documentaries whose eligibility for the exemption is challenged.

### Deletion of CATV registration requirement proposed

The commission has proposed new rules which, if adopted, would end the requirement that cable TV systems file registration statements when they add new TV signals.

The commission said the current requirement that such registration statements be filed is no longer necessary because cable operators must indicate what signals they are carrying in their annual reports to the commission (FCC Form 325). Registration statements reporting a new system's initial carriage complement still would be required, however.

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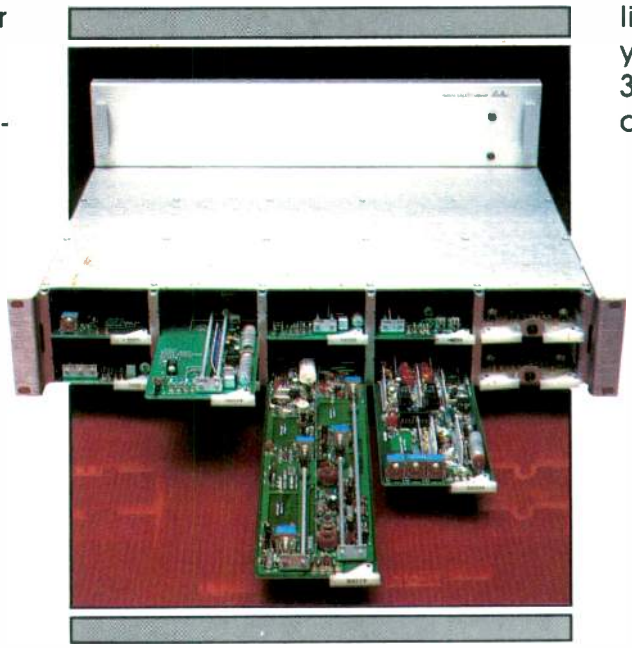

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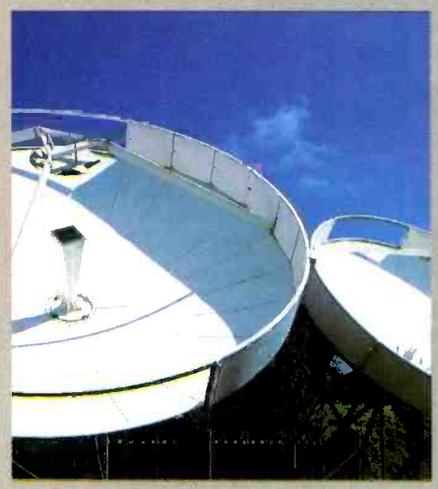

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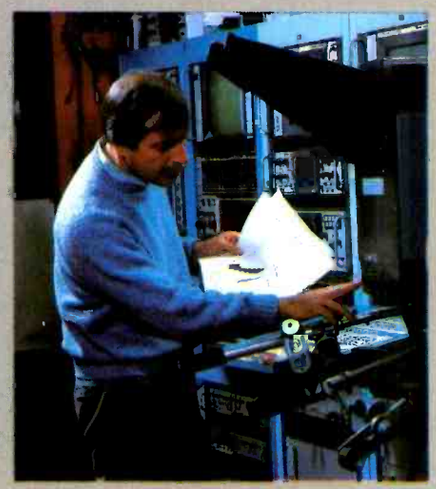

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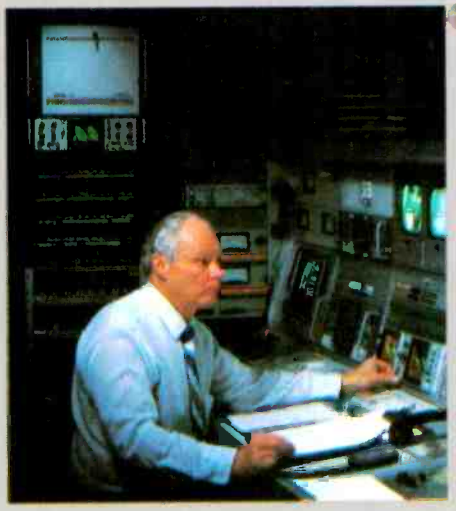

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# Standards:

## A time for action

As we enter 1984, we are close to losing control of world standards destined to shape our future. The world's need for programming—video and audio—and the importance of satellites for distribution are urging action regarding standards.

But, this is not new, this cry for industry standards. It has long been an important aspect within the Society of Motion Picture and Television Engineers (SMPTE) and within its predecessor—the SMPE, before television was added to the scope of its coverage.

To illustrate this long-standing emphasis on standards, note the following excerpts from SMPTE addresses:

*"Every new industry standardizes sooner or later, whether we will it or not. It is our duty, therefore, as engineers, to wisely direct this standardization, to secure best standards of equipment, quality, performance, nomenclature and, unconsciously perhaps, a code of ethics. It is entirely a practical and attainable ideal. But we should recognize our responsibility to fix standards with due regard for the interests of all concerned. It is an unselfish exchange of views which will make our gatherings interesting, and the discussions of individual investigation valuable.*

*"Fortunately, one of the factors of our industry is already standard, the film. In this it is unique, for motion picture film is the only thing that is standard the world over. That has given us the world as a selling field, and doubtless accounts very largely for the extraordinary growth of our business."*

C. Francis Jenkins
First SMPTE President (1916-1918)
Chairman's SMPE Address, October 1916

*"I don't think the answers to the future are the latest developments in hardware or software—but in* ***brainpower.*** *That means not only the creativity to use the equipment—but the creativity to make sound choices about what's workable and efficient, not just in technical terms, but for our viewers.*

*"In talking about the kind of creativity that's needed, I want to look at the need for three kinds of standardization: standardization of expectations...standardization of efficiency...and standardization of equipment.*

*"When I talk about standards of expectations—bringing what we expect from technology in line with reality—I believe the most important standard of all is* ***practicality.*** *Is the new machine or system better...give a different look...more reliable...or more efficient than what's now operational?*

*"When we talk* ***efficiency,*** *we're talking cost benefits...and, ultimately, as with everything, we're talking about the quantity and quality of the product that reaches viewers. The dangers of inefficiency are all too apparent in what's happened to the automobile industry and to steel companies. Programming is our product—and, ultimately, the test of whether or not we survive or fail in today's competitive marketplace with more video products and means of distribution than ever.*

*"As for standardization of equipment, we all accept the need for standards; it's the* ***how*** *that's creating confusion. My concern is both with the professional standards that affect producers, distributors, broadcasters and manufacturers...and the standards affecting the public.*

*"We saw what happened when an industry committee failed to recommend a single AM stereo standard—and instead proposed five different standards for the FCC. And the same thing happened when another industry committee failed to come up with a teletext standard. We're also groping along without a single standard for ½-inch tape and the problems are very obvious. Now I don't have a magic wand to wave. Neither does anyone else. But, I do have an admonition for all of us involved in trying to produce standards—whether for the industry or for the consumer—and that's the necessity of* ***action.*** *We can't expect that developments will wait on our coming to an all-purpose solution, agreeable to everyone, but we can come up with workable compromises that will reduce the amount of confusion that's now emerging. Never before has the need for action from this organization been so urgent. We've got to convince the FCC and Congress that* ***marketplace*** *is not always the answer.*

*"We don't have the luxury of time to come up with cohesive standards that*

Continued on page 130

# BIG NEWS.
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Announcing Thomson Betacam.™ The smallest, lightest ½" camera/recorder ever. All in one neat package. With superior signal-to-noise performance. Designed with *both* ENG and EFP operators in mind. For on-the-spot news gathering or complicated field production, now there's a system just right for you. And your budget. Because Thomson Betacam also carries the lowest price tag.

Available in one- or three-tube camera models, Thomson Betacam utilizes the newest electronics and manufacturing techniques. A ⅔" Mixed Field Saticon tube design that virtually eliminates beam defocusing. A VTR featuring a rugged new recording format with greater chrominance bandwidth and signal-to-noise ratio. Built-in Dolby® noise reduction for high-quality audio. And a cassette player with TBC as standard, providing full broadcast quality output. Plus, the playback unit can be interfaced with U-Matic® and one-inch editing systems. This makes Thomson Betacam the ideal complement to your existing production equipment.

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# Satellite update

By John Kinik, satellite correspondent

### Orbital positions

In the past six months, several developments have changed the orbital positions scenario, including the FCC ruling on 2° spacing, the RARC-'83 Conference on Region 2 (Western Hemisphere) DBS satellites and a new flurry of filings for orbital positions received by the FCC in November. During the past year, we have discussed the various types of satellites—C-Band, Hybrid (C- and Ku-Band), Ku-Band and DBS (use different portion of Ku-Band)—as well as the orbital position assignments made by the FCC and by RARC-'83. It is appropriate to review the situation for the beginning of 1984 to get an overall view of the number of satellites in each category that now can be expected. Table I summarizes orbital position status.

It readily can be seen that the C-Band orbital resources will be saturated if all new applications are granted. This means that by 1987 the ruling on 2° spacing made by the FCC last August probably will be fully implemented. Of course, the new Hybrid satellite applications also must be considered, because they also employ C-Band.

**Table I.**
**Orbital position status summary—January 1984.**

| | C-Band | Hybrid (C- and Ku-Band) | Ku-Band | DBS |
|---|---|---|---|---|
| Available positions | 35* | (TBD) | 70* | 17 |
| Current authorizations | 24 | 8 | 20 | 17 |
| New position applications | 12 | 14 | 24 | ..... |

*Assumes 2° spacing for C-Band and 1° spacing for Ku-Band.

In the case of Ku-Band, the FCC will implement 1° spacing to accommodate the new applications. If all new Ku-Band applications are granted positions, 44 positions will be authorized, leaving 26 additional positions for future applicants.

A much more detailed picture of the current authorizations is given in Table II. The FCC will consider the requested positions in new applications and will allocate positions in the most equitable manner. Some vacant positions have multiple applicants because they are more desirable than others, and the FCC will have to consider the merits of each applicant's arguments. Once the allocations have been made, a much clearer picture will emerge on the planning necessary by C-Band earth terminal operators for 2° spacing, because the positions of all C-Band satellites will be determined.

**Table II.**
**Orbital position authorizations—January 1984.**

| Orbital position (Degrees W. Long.) | C-Band | Hybrid | Ku-Band | DBS | Launch Date[5] |
|---|---|---|---|---|---|
| 175 | | | US | | |
| 166 | | | | US | |
| 157 | | | | US | |
| 148 | | | | US | |
| 143 | Satcom 5 | | | | 1982 |
| 141 | Unassigned | | | | |
| 139 | Satcom 1R | | | | 1983 |
| 138 | | | | Canada | |
| 137 | Unassigned | | | | |
| 136 | | | | Mexico | |
| 134 | Galaxy 1 | | | | 1983 |
| 132 | | | Rainbow | | 1986 |
| 131 | Satcom 3R | | | | 1981 |
| 130 | | | ABCI[1] | | 1986 |
| 129 | | | | Canada | |
| 128 | | Amsat 1 | | | 1985 |
| 127.5 | Comstar D4 | | | | 1981 |
| 127 | | | | Mexico | |
| 126 | | | RCA[2] | | 1985 |
| 125 | Telstar 4 | | | | 1985 |
| 124 | | | SBS 5 | | 1986 |
| 122 | | Spacenet 1 | | | 1984 |
| 120 | | | USSSI | | 1986 |
| 119.5 | Westar 5 | | | | 1982 |

*Continued on page 14*

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Circle (14) on Reply Card

*Continued from page 12*

| | | | | | |
|---|---|---|---|---|---|
| 119 | Satcom 2 | | | US | 1976 – Satcom 2 |
| 117.5 | | | Anik C3 | | 1982 |
| 116.5 | | Mexico | | | 1985 |
| 114 | Anik A3/A2 | | | | 1975/'72 |
| 113.5 | | Mexico | | | 1986 |
| 112.5 | | | Anik C2[4] | | 1983 |
| 110 | Anik D2 | | | US | 1984 – Anik D2 |
| 109 | | Anik B | | | 1978 |
| 108 | Anik D3 | | | | 1986 |
| 107.5 | | | Anik C[1] | | 1984 |
| 105 | | | G Star 2[4] | | 1984 |
| 104.5 | Anik D1 | | | | 1982 |
| 103 | | | G Star 1 | | 1984 |
| 101 | | Unassigned | ★ [3] | US | |
| 99 | | | SBS 1 | | 1980 |
| 98.5 | Westar 4 | | | | 1982 |
| 97 | | | SBS 2 | | 1981 |
| 96 | Telstar 1 | | | | 1983 |
| 95 | | | SBS 3 | | 1982 |
| 93.5 | Galaxy 3 | | | | 1984 |
| 93 | | | Unassigned | | 1984 |
| 91 | Westar 3 | Spacenet 3 | | Canada | 1985 – Spacenet 3 |
| 89 | | | SBS 4[3] | | 1984 |
| 88.5 | Telstar 3 | | | | 1985 |
| 87 | Comstar D3 | | RCA | | 1978 – Comstar D3 |
| | | | | | 1986 – RCA |
| 86 | Westar | | | | 1984 |
| 85 | | | USSSI | | 1986 |
| 83.5 | Satcom 4 | | | | 1982 |
| 83 | | | ABCI | | 1987 |
| 82 | | | | Canada | |
| 81 | | Amsat 2 | | | 1986 |
| 79 | | | Rainbow | | 1986 |
| 78.5 | Westar 2 | | | | 1974 |
| 77 | | | RCA | | 1987 |
| 76 | Telstar 2 | | | | 1984 |
| 75 | | | Unassigned | | |
| 74 | Galaxy 2 | | | | 1983 |
| 73 | | | Unassigned | | |
| 72 | Satcom 2R | | | Canada | 1983 – Satcom 2R |
| 71 | | | Unassigned | | |
| 70.5 | | | | Canada | |
| 69 | | Spacenet 2 | | Mexico | 1984 – Spacenet 2 |
| 67 | Satcom 6 | | ★ [2] | | 1985 |
| 61.5 | | | | USA | |

[1]Advanced Business Communications Inc. (ABCI) has requested 126° instead of 130°.
[2]RCA has requested 67° instead of 126° for Ku-Band satellite.
[3]SBS has requested temporary use of 101° for SBS 4 to provide interim pre-DBS service to Satellite Television Corporation.
[4]Anik C2 temporarily at 105° for United Satellite Communications until G Star 2 is launched.
[5]All DBS launch dates are after 1986.

# news

## TEK suggests VBI usage alternatives

The future of the vertical blanking interval (VBI) has yet to be decided, but Tektronix suggests that it may become a major source of revenue for broadcast facilities. To that end, TEK has suggested some revisions to the current use of VBI lines.

In the past, certain VBI lines have been assigned to specific functions. A vertical interval test signal (VITS) package has been established, particularly for the purposes of monitoring the transmission system. Line 17, Fields 1 and 2, carry multiburst and color bar signals, respectively; Line 18, Field 1 uses a composite of a modulated staircase, 2T and modulated 12.5T $\sin^2$ pulses and an 18$\mu$s white bar. The Line 18, Field 2 time also has carried a composite signal or could be used with other test signal formats. Line 19 of both fields is occupied by the vertical interval reference signal (VIRS), which includes black, luminance and chrominance references.

Some years ago, the Public Broadcast Service (PBS) initiated a captioning service for the hearing impaired. PBS was joined in this endeavor by ABC and NBC with a clocking signal and character data inserted into Line 21, Field 1, with the Field 2 half line providing a pseudo-random framing code. Other captioning formats, as well as source identity signals, have been placed on other lines within the VBI. These functions generally are non-commercial in nature, as compared to textual/graphic data, which may be highly commercial.

At present no agreement has been reached on which of the teletext-type data systems will be used in the United States and/or North America. Conceivably, no one data format will be selected as a standard. If that is the case, then arrangements might need to be made to transmit more than one type of signal on a single signal, particularly if the services provided could be "leased" by the broadcaster. Services that might be transmitted in such a way included utility management, financial data, remote control/telemetry information, video game data, scrambling/

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**Six-digit readout:** Automatically tracks every CRT test. We call it digital autotracking. It's patent pending.

**Bright dual-trace CRT:** 60 MHz (– 3 dB); 100 MHz (– 12 dB).

**Delta PPV, Time, Freq:** Measure any part of a waveform for PPV, time or frequency using Delta measurements. Just dial in the waveform section you want to measure and push.

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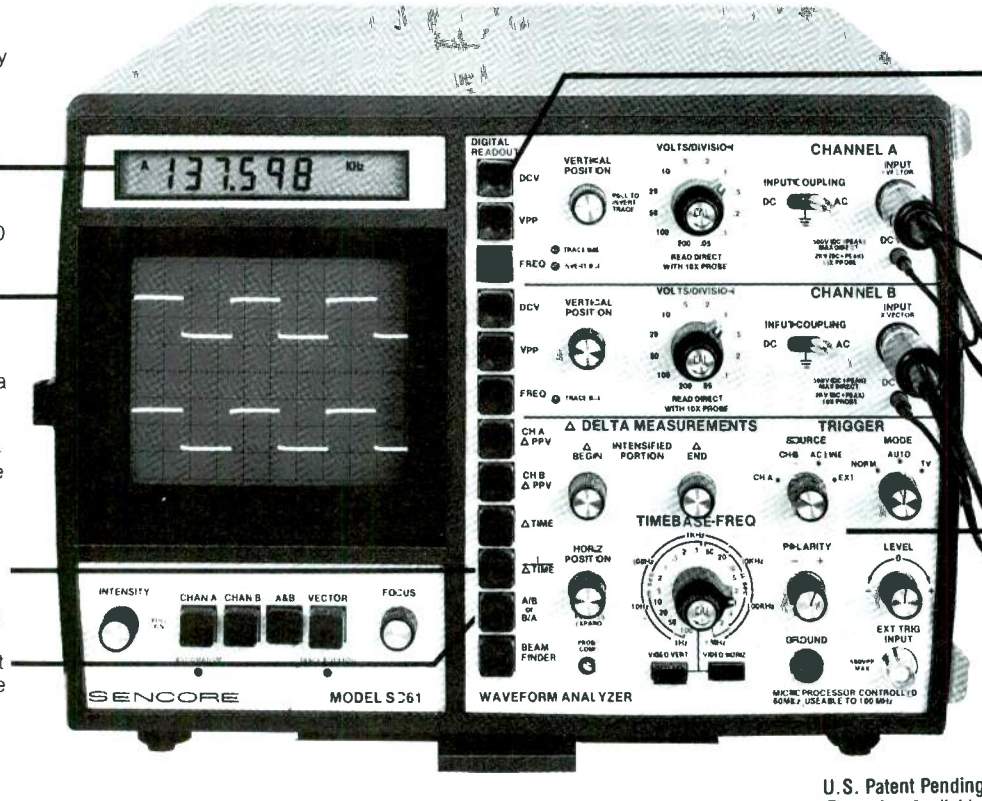


**Autotracking DCV, PPV, Freq:** Measure DCV to .5%; PPV to 2%; freq. to .001%. Just push a button for either Channel A or B.

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**Circle (17) for demonstration**

descrambling algorithms and data networks. As our needs for increased communications capabilities are addressed, the means of fulfilling those needs may result in concepts not yet developed.

With approximately 10 lines of each VBI field time taken up by NTSC vertical sync information, the remaining lines, 11 per field, may become a high priced commodity in terrestrial and satellite-relayed transmissions. To ease a potentially crowded situation and to expand the VBI communications possibilities, Tektronix has looked into a means of providing all required test signals within a single line of a single field. In backing such a concept, several TEK products have been suggested as a means to implement a single-line test facility.

For insertion of the typical test signals, the 1910 NTSC digital test signal generator and inserter may be used with a computer-based controller/sequencer, via an RS-232C control port. Along with the normal signals, the 1910 system may be ROM-programmed with a variety of special *multipulse, eye test* and custom-designed signals, thus offering a broader spectrum of transmission system parameter monitoring than currently is available. The digital generator also allows up to four external VITS inputs for captioning, source ID or data insertion. Monitoring of the sequenced test signals would be done with the 1980 ANSWER equipment.

Although the TEK equipment is now available to provide the multifunction insertion features and monitoring, the concept is offered to the industry to initiate discussions on how the VBI will be used in the future.

### EMI control facility in operation

An open area test facility now in service at Southwest Research Institute (SwRI) will help manufacturers of electronic equipment comply with new FCC regulations designed to control the level of radiated electromagnetic interference (EMI).

The facility, one of the few such centers available for public use in the Southwest, is located in an open area of the institute grounds and consists of a rotatable test platform, erected on a flat floor, on which an antenna mast assembly for the EMI measuring equipment is moved.

The platform resembles a large record turntable 18 feet in diameter. It supports loads of up to 6000 pounds, and provides more than enough power, at any standard load and frequency, to operate the equipment under test. Any devices, from small personal computers to large mainframe equipment and full-size vehicles, can be tested.

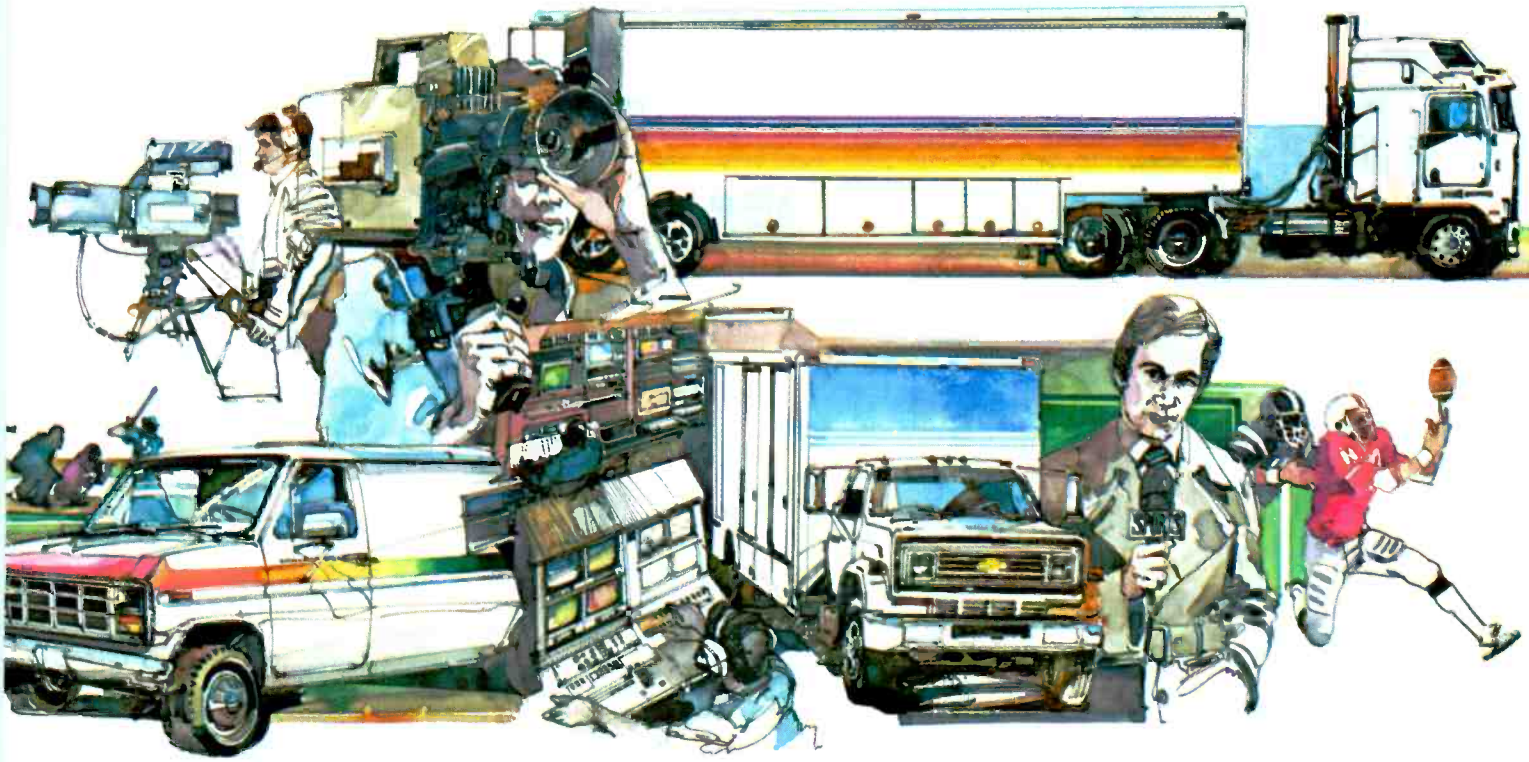
Because the platform is wooden, it does not reflect radio waves and, thus, does not interfere with testing. The table can be rotated continuously in a full circle and interference strengths measured in all directions.

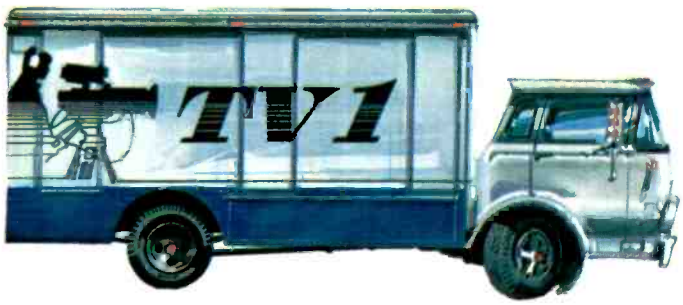
The test floor is a flat, 30'x75', paved asphalt surface, covered with a ¼-inch mesh wire screen. The screen transforms the test floor into a fixed reference ground plane that facilitates system calibration and provides a standardized environment. Antenna and power control cables are installed under the screen to prevent spurious measurements and reflections.

The antenna, which receives EMI from the equipment being tested, is mounted on a non-metallic mast and can be positioned at variable heights of 1-6m. A wheeled cart transports the mast to different positions on the test floor, particularly to the 3m, 10m, 30m and 100m distances specified in EMI standards test measurement.

The facility provides rapid tests for compliance with FCC and other international regulations. San Antonio's low electromagnetic ambient levels, relatively isolated location and mild weather combine to permit open-area radiated EMI test measurement on a year-round basis.

# MOBILE TELEVISION UNITS

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To record still frames, for example, instead of waiting for the machine to click, reverse, whirl, click, click, go forward and then record, it simply goes click, record. There's no wasted time. No wasted effort. You'll think you're working with film.


And the profit potential is massive. Because the Sony BVH-2500 will keep your editing costs way down and your productivity way up.

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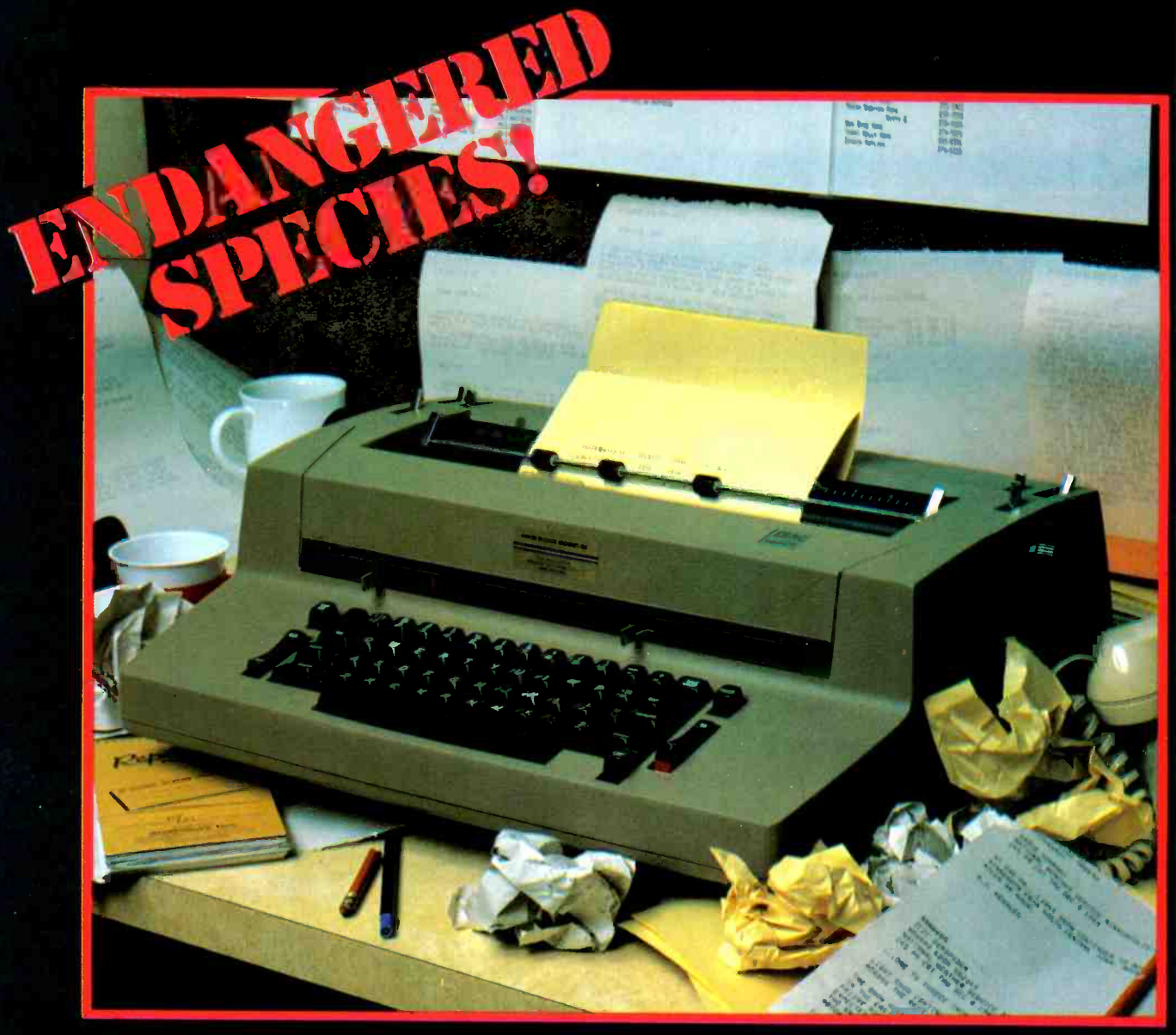
For more information (and there's a lot more to know about video recorders) in New York/New Jersey call Sony at (201) 833-5350; in the Northeast/Mid-Atlantic (201) 833-5375; in the Midwest (312) 773-6045; in the Southeast (404) 451-7671; in the Southwest (214) 659-3600; in the West (213) 841-8711.

SONY Broadcast




# Will These Go the Way of the Green Eyeshade?

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# Newsroom automation: New technology at KIRO

By Mark Gardner, managing editor, KIRO-TV, Seattle, WA

KIRO's TV and radio news departments have been industry pioneers in both ENG and computerized newsrooms. So, their experiences may help station managers and news directors who are considering a similar move to computerized newsroom operation.

1984 may turn out to be the year of the newsroom computer. Having spent its infancy at KIRO in Seattle, one such computer, the NewStar, is coming of age.

Now ranked 15th in market size, Seattle is growing. KIRO, the city's most powerful broadcast facility, is growing with the city. Its AM and FM properties, KIRO-AM and KSEA-FM, are ranked first and second in a 46-station market. KIRO's *News Radio* alone brings in 30 cents of every radio dollar spent in the market.

In recent years, KIRO-TV has revitalized its physical plant and has become the market's dominant source for news. Today, KIRO-TV, by broadcasting nearly five hours of local news daily, is one of the largest local news programmers in the country. Ken Hatch, KIRO president, is dedicated to making the Seattle properties the area's news source.

The KIRO-TV Chopper Seven helicopter (above) is used for live news broadcasts and as a repeater station when needed for live ground shots. The KIRO-TV computerized *Eyewitness Newsroom* is shown below.

KIRO's TV operation went all-ENG in 1975 with the first generation of HL-33s. At that time, there were only three units on the street, but the department grew quickly. Today there are 15 fully equipped units, a deluxe helicopter, two self-contained vans and a half-dozen other microwave units. There are 115 employees in TV news and another 37 in radio. KIRO also is supported by a satellite-linked Washington, DC, bureau and a microwave-connected bureau at the state capital.

All of this equipment is maintained by the news department's engineering staff of five full-time employees. Its slogan underscores the ENG success: "Maintenance and Repair" (rather than "Repair and Maintenance"). Every piece of equipment—including cameras, recorders, editing decks and microwave gear—is scheduled for routine maintenance. Rarely does any equipment break down in the field, and few news crews are disappointed because of equipment failure.

From its *Eyewitness Newsroom*, KIRO-TV airs the typical morning cutins, an hour at noon, an hour at 4 p.m., another at 5 p.m., a half-hour at 7 p.m., PM newsbreaks, a half-hour at 11 p.m. and another 15 minutes at 11:30 p.m. (a *Nightline*-type show called *Close-Up*). John Lippman, vice president and news director of KIRO-TV, is responsible for this programming.

KIRO was first in the Seattle market

with a news helicopter, and today KIRO-TV flies Chopper Seven an average of 70 hours per month. It is used in almost every newscast, if not directly on the air then indirectly, as a relay for a microwave shot in Seattle's hilly terrain.

KIRO's radio news department has its own chopper operation. Pilot Paul Brendle has become an important radio personality, broadcasting morning and afternoon drive-time traffic reports. Brendle's reports now feature the Commuter Computer, a microprocessor that computes the drive time on alternate routes. The computer is a boon to many of the city's east-side commuters that must travel to work on two easily clogged bridges over Lake Washington.

But the most futuristic thing at KIRO is the newsroom computerization. KIRO helped refine the NewStar system, which has since been purchased by a number of other radio and TV stations in the United States. The system also is being used by the news department of CBS Radio in New York.

When radio news director Vic Bremer came on staff five years ago, he toured KCBS-AM, which had just launched a joint experiment with Integrated Technologies (now a division of Colorgraphics Systems) and United Press International. Bremer, who was sold on computerization, undertook the job of selling management through planning and capital budgets. The first nine terminals were delivered in June 1982, and within three weeks, the staff and computer went to a paperless newsroom.

"It immediately made the job a lot easier," Bremer said. "The computer is necessary for information management." But he warned that the computer "must be treated as a tool, nothing more. It doesn't make news judgments or replace people. News still boils down to humans."

With the computer, an editor can speed through the wire in a matter of keystrokes, no longer having to walk to a half-dozen wire printers and cut and collate a ream of paper every 10 minutes. Moreover, because the delivery of electronic news is not bottlenecked by a slow, mechanical printer, bulletins come to terminals at the speed of light. With a single keystroke, the bulletin appears on the news announcer's screen and is immediately broadcast to listeners. "I've seen this speed up the bulletin process some 20 minutes," Bremer said.

Bremer sees many other benefits besides speed. "Because the editors don't have to wade through so much paper, their job has become easier," he said. "They don't burn out as quickly. Copy is cleaner and more creative."

Interview information is archived in the computer's memory and, when listeners call, station personnel (including someone who did not hear the broadcast) can answer questions with just a few keystrokes, which reduces frustration.

At the heart of *News Radio*'s system is the NewStar computer, the same computer built by Integrated Technologies and used at KCBS Radio in San Francisco.* KIRO *News Radio* now has 13 terminals and three printers. Bremer said that he chose the NewStar because of the number of microprocessors in the system. Every two I/O devices (terminal, printer or wire input) share a dedicated 8085 processor.

"When you start adding devices, that becomes critical," Bremer said. "Speed is crucial in our business. If you have to wait while the computer is searching, you're going to get beat."

The TV side carefully watched the radio experiment. In 1983, KIRO decided to computerize TV news and began searching for venders.

What we at KIRO-TV found at NAB was basically that one system could meet our needs, and that was NewStar. I was familiar with radio's operation and how the NewStar worked. What I wanted was a good report generator, something that could handle the detail work that producers and assignment editors face. I found this feature in the NewStar system.

To make the transition to computer-

Shown is the NewStar computer system installed in one of KIRO-AM's air studios (directly below). One of the newsroom terminals at KIRO *News Radio* appears at the bottom of the page.

*See **Broadcast Engineering** July 1981, pages 20-24.

*Continued on page 26*


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The model above is pictured with the optional battery pack.

Tektronix introduces a new product to help improve your signal quality: the 1740 series portable waveform/vector monitor.

We know that in-studio or out on remote space is critical. And the smaller the equipment is, the better. So we've combined our waveform and vector monitoring functions, and integrated them into one compact, go-anywhere package.

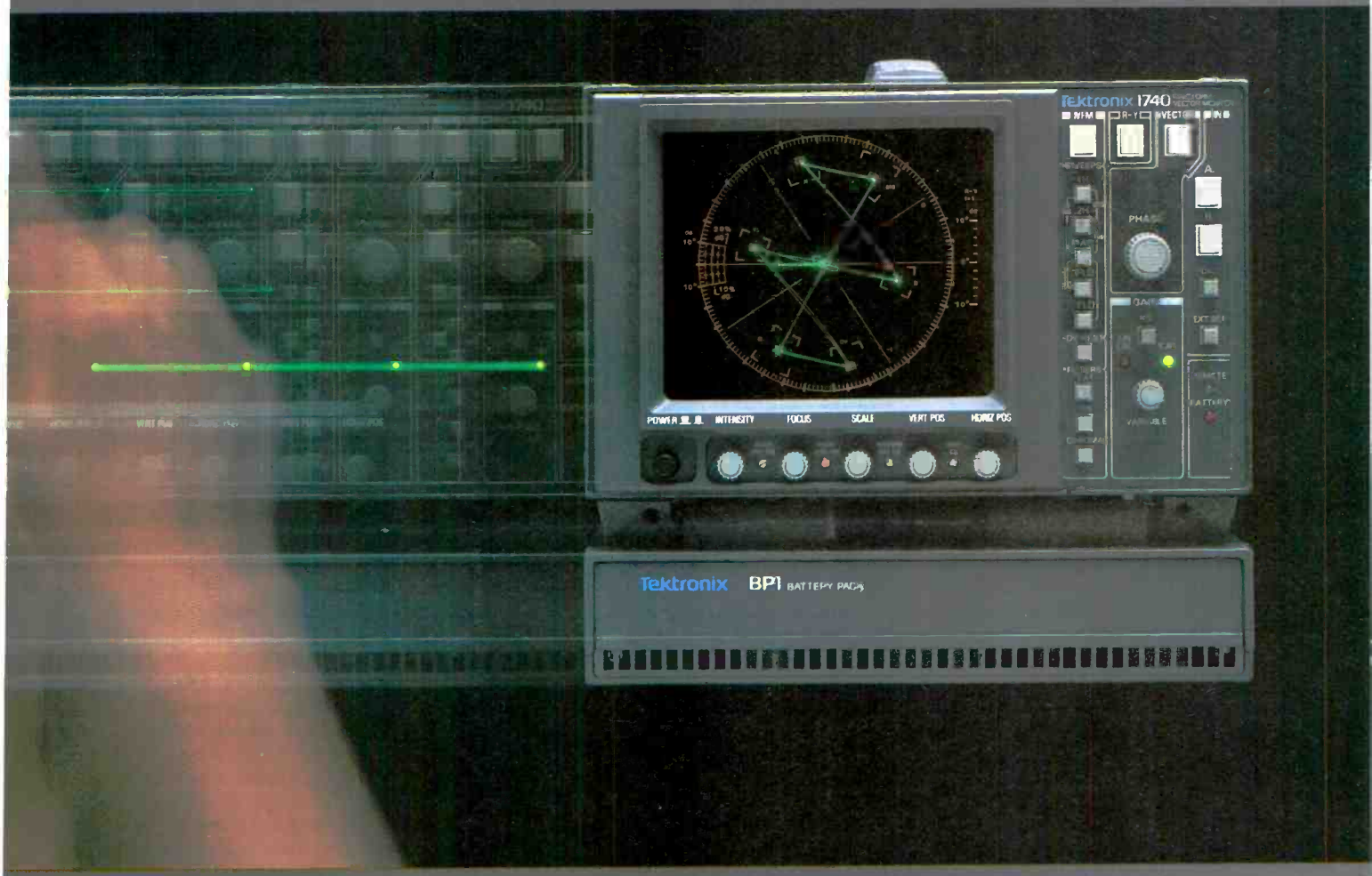
## HALF THE RACK SPACE.

At 8½ inches wide and 18 inches long, the 1740 series uses only half the normal rack width. That means you gain more usable space and more flexibility than ever.

To change from waveform mode to vectorscope mode and back, just press a button. Couldn't be simpler.

There's a brighter CRT display on the 1740 series, too. Viewing is easy even in high ambient light.

And, because it operates on either AC or DC, the 1740 can go wherever you go.




**TWO-IN-ONE ECONOMY.**

Using one monitor when two were needed before lowers your equipment costs. And because the 1740 series is completely portable, it makes a sensible purchase for either studio or field use.

And there's more. The 1740 series operates on only 50 watts of power. And that means less heat build-up (which is important in crowded equipment racks).

And in addition, there's a single-line display preset for monitoring VIRS.

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Now that you've heard about our new two-in-one tool, you should see one. Call or write us for a demonstration. We have field offices in most cities. Or you can call Toll Free 800-547-1512 (in Oregon 800-452-1877), or contact your authorized Tektronix professional video dealer.

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Circle (20) on Reply Card

At left is a close-up of one of the CRT terminals used in the KIRO-TV system. The CPU assembly and support electronics for the computerized system at KIRO *News Radio* are shown below.

*Continued from page 22*

ized operation smoother, KIRO-TV pre-sold the system to the news staff. I put out a memo answering basic questions, such as: "Why do we need a computer? Couldn't the money be better spent?" By the time the engineers and instructors arrived, the staff was lined up and ready to learn. Training has gone efficiently (considering the size of the staff) and our first show went on-line with the system about a month after the computer arrived.

Conversion to a computerized news operation has opened many new possibilities to KIRO-TV's personnel. With modems and a remote terminal, crews can access not only all the wire stories, but also other scripts and archived material while in the field. I envision the day when reporters will type their stories on portable computers in the field and transmit them back to the newsroom. The technology is here right now.

When considering the purchase of a newsroom computer system, the speed of operation should be considered carefully. Probably the biggest item a computer can tackle for any news department is library and archive storage. I do not know a news director who has not complained that the videotape library and script archiving has gotten out of hand. KIRO-TV's system is configured to allow rapid access to various files, while at the same time not tying up the central processing unit. Also, each terminal is smart enough to handle all the word processing internally, without accessing the main chassis.

Three of KIRO-TV's news show producers have worked with other computerized news operations, and are favorably impressed with the NewStar. Bryan Thielke's computer story is probably the most interesting. Thielke was the producer of an infamous newscast at KSL, Salt Lake City, in which a newsroom computer *ate it* less than 30 minutes before the broadcast. With the NewStar system, however, he has no fear that such an incident will happen again. The radio news department's experience with the system has been good, despite thunderstorms and power outages.

Several protection systems are designed into the NewStar computer, including parallel systems so that data is stored on two separate discs. In this way, stories cannot be lost because of a catastrophic disc crash.

KIRO is happy to be participating in the computer revolution for the broadcast industry. After just a few months using the NewStar system, we have found it to be an indispensible tool. I, for one, would never want to work in a newsroom *without* a computerized system.

**Editor's note:**
Stations wanting more information on the NewStar computer system or details on the newsroom automation equipment and programs available from other manufacturers can consult page 75 of the November 1983 issue of **BE**, which contains a detailed listing of suppliers.

# Ramko Research Explodes The Reel To Reel Versus Stereo Tape Cartridge Myth!

**FACT:** There is now a stereo cartridge system so advanced that you can't tell the original material from the reproduction. A system that performs like a professional reel to reel, yet has all the advantages inherent in the tape cartridge format. The PhaseMaster from RAMKO RESEARCH. The only cart system in the world that allows AM or FM to program in full stereo. Spots, special effects, Beethoven, or hard rock. Consistently, everytime, cart to cart, machine to machine. Not only that, but there are over 300 systems that have been field proven for the last 1½ years. No bugs, no surprises. What you see and read about is what you get.

**MYTH:** Tape cartridges do not have the mechanical stability nor precise enough guidance systems to produce truly high quality, wide separation, stereo.

**FACT:** The new PhaseMaster completely eliminates this problem via its exclusive electronic, real time, tape path and phase correction circuitry. No pretesting of carts or adjustments to make. It is so sophisticated and responsive that you can actually bend, twist and move the cart in and out while playing, without any discernable difference between the original source material and that which is being reproduced. In fact, in all of our demonstrations to broadcast managers and engineers, none could tell the difference between an A/B comparison of the record played and that simultaneously reproduced on the PhaseMaster. In addition, this exact reproduction will be repeated on any other PhaseMaster, regardless of head and tape guide alignment (within reason) or cart warpage. No other machine in existence, reel to reel or cart, has this ability.

**MYTH:** Only reel to reel provides the low noise and distortion, and the wide response demanded by my listeners.

**FACT:** We are willing to match the PhaseMaster against anything you are currently using or anticipate buying. Judge for yourself or ask for our comparison guide. We believe you'll agree with us (and our competitor's engineers), that RAMKO has indeed advanced the state of tape cartridge technology far beyond what was believed possible.

**TO SUM IT UP:** If you are stereo formatted and looking for the best, most effective way to program your station, then the PhaseMaster is your answer. Whether it's highbrow or punk rock, you will experience the best of both worlds with all the quality demanded by even your most discerning listeners.

Find out for yourself the whole PhaseMaster story. From its superior mechanics for long term wear and stability, to the totally unique phase correction circuitry and 2 year warranty.

Contact your nearest rep or dealer today, or call RAMKO RESEARCH toll free, (800) 821-2545, for your full color, descriptive brochure. Hurry though, your competition may have already ordered theirs.

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# ENG/EFP camera update:

# The new and the refined

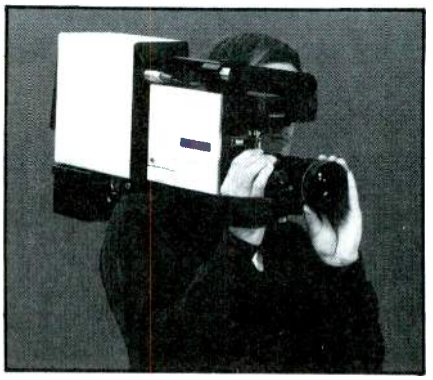
By Carl Bentz, television editor

A variety of attributes can be given to the ENG and EFP cameras that appeared at NAB-'83 and since. The terms smaller, lighter weight, greater S/N ratio, greater sensitivity and operational simplicity apply to each of the new camera systems now available. MOS CCDs have been shown to be viable substitutes for camera tubes by several manufacturers. Interface systems show continued efforts in component video for recording and subsequent video processing.

To some extent, the cast of players of camera manufacturers has started to change as companies alter their marketing thrust in the TV industry. Panavision Electronics (formerly CEI) and Toshiba have said that they do not intend to make direct sales. Their products are for rental or are manufactured on an OEM basis. Other companies have dropped some products and introduced others since the **BE** roundup in January 1983.

The following brief product update will help keep you informed of the ENG and EFP camera systems available as of the end of 1983. For complete information on the products, Reader Service Numbers have been provided. For information on more established products not found in this listing, refer to the ENG camera roundup in **BE** January 1983 (pages 52-74) and the 1983 *Spec Book*.

## AMPEX



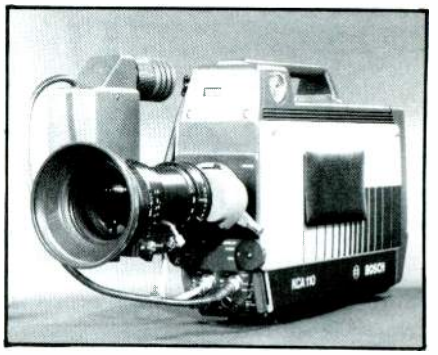
Ampex FPC-10/ARC-10

**FPC-10.** Offered in Saticon or Plumbicon, the FPC-10 VRC system is a 3-tube design, using ⅔-inch tubes with prism-optics. The 59dB S/N ratio is based on Plumbicons for NTSC television. A sensitivity of 200fc at f/4 and a resolution to 600TVL is specified. The FPC-10 camera mates with an M Format recorder to form the ARC-10 VRC system. In the studio, the ARC-40 studio recorder and ARC-30 editing controller complete the system.

**Circle (350) on Reply Card**

## BOSCH/FERNSEH

**QuarterCam.** The KBF 1 camera is designed around three ½-inch Plumbicons and prism-optics. For NTSC, the system is rated at 54dB S/N from the camera, with a sensitivity of 900 lux, f/2, and a resolution of G ≥ 40% at 4MHz. The QuarterCam system includes the KCF 1 camera and the BCF 1 ¼-inch video recorder, using the Bosch LINEPLEX component format on CVC videocassettes. For quick production in the field, the BCF 20 field editor system provides editing facilities with BCF 1 transports. Back at the studio, the BCF 10 studio recorder offers interfacing to existing editing controllers.



Bosch KCA 110

**KCA 110.** Introduced at NAB, the KCA 110 uses three ⅔-inch LOC Plumbicons with prism-optics to develop a 57dB S/N rating in the NTSC standard. Standard sensitivity is 1250 lux, while resolution is slated at 750 TVL. A fold-down optical block simplifies tube changes. Add-on units attach to the rear of the camera for EFP, optical fiber, multiwire and service function configurations. PAL, PAL-M, SECAM and NTSC standards are served by different models. A base-station unit is available for multiwire and optical fiber modes.

**Circle (351) on Reply Card**

## HARRIS

Harris TC-90S

**TC-90.** The 3-tube TC-90, using ½-inch Plumbicon or Saticon tubes and prism-optics, was shown at NAB-'83 with the "smart package" option. Included in the option is autocentering, as well as SMPTE and VITC time code generation. The automatic feature in the option also allows registration at the touch of a button without charts or diascopes. 600 TVL resolution is typical with an S/N rating of 55dB for NTSC and a 56fc sensitivity at f/1.4.

**Circle (352) on Reply Card**

## HITACHI

Hitachi SK-97

**SR-1, SR-3.** Two VRC systems provide Y and C component video for use with ½-inch or ¼-inch recorders. The SR-1 uses three ⅔-inch CCDs attached to a prism-beam splitter, while the SR-3 employs ⅔-inch Saticons. As of early November, Hitachi said that an

effort was under way to work with Bosch in further development of its ECR-5 ¼-inch recorder with integral time base corrector. The ½-inch recorder is based on the M Format.

**FP-11.** A single 1-inch M-type trielectrode Saticon is used in the FP-11 camera for stand-alone or remote-controlled operation. The camera is capable of providing RS-170A video, and may be obtained in PAL-B color as well.

**FP-15.** NTSC and PAL-B are served by models of the FP-15 camera, which uses three ⅔-inch mixed-field Saticons. Precision registration yokes and automatic functions make the camera easy to operate in ENG and EFP applications.

**SK-97.** A microprocessor in the camera head handles automatic setup of the SK-97 Computacam. Based on a 3-tube, ⅔-inch design, the SK-97 may be operated with a remote control unit and base station or through a digital command unit. It also is compatible with the automatic setup systems for the SK-970 and KS-110 studio cameras.

**Circle (353) on Reply Card**

## IKEGAMI

**HL-79E.** The latest edition of the HL-79 series is the 3-tube, ⅔-inch format HL-79E. The camera is fully automatic for ENG, EFP or studio configurations and includes ADC-79E auto setup digital control and RDC-79 remote digital control units for multicore or triax operation. With S/N ratio of 57dB and sensitivity of 200fc, f/5, the camera is capable of a resolution greater than 600 TVL. The E version is lighter weight than previous units in the series.

**ITC-730.** A 13.5mm cable is used between the CCU and the camera in the ITC-730 system. The 3-tube, ⅔-inch format camera operates through a digital multiplex scheme. Power for the CCU may be derived from an ac source or from the camera battery pack.

**EC-35.** Designed to incorporate a film look to the video, the EC-35 includes a number of features to make a film camera operator feel at ease. Such items as T/stops on lenses and dual viewfinders have been added.

**New VRC.** Shown at SMPTE for the first time, Ikegami introduced a 3-tube Plumbicon camera that will match the Bosch QuarterCam recorder. Marketing of the camera with Ikegami's ½-inch M Format recorder will be concurrent with the ¼-inch. Availability of the camera and further details are unknown at press time.

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Ikegami camera with Bosch QuarterCam recorder

# The definition of the best color camera tubes in the world.

No matter how you define your color camera needs, you will want to be certain you have chosen the best tube for the job. And no technical appraisal can be complete without EEV Leddicons.

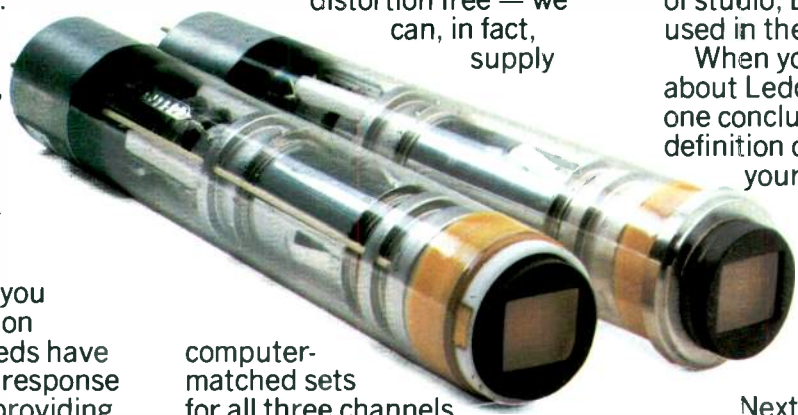
Take lag or smearing. Because Leddicons incorporate a unique light bias arrangement, shading is minimal. So is differential lag. The result is that a football in flight will always look like a football — not a flying saucer!

As for color imagery, you simply cannot improve on Leddicons. Extended reds have a precisely-engineered response with an infra-red filter providing cut-off exactly where you want it.

Or compare the highlight image performance of Leddicons with other tubes. The difference is that the retention effect is minimised by a unique target manufacturing process — even in the very difficult extended red channel where other tubes are simply unable to cope.

You'll certainly want to avoid blemishes. That's why all Leddicons must satisfy the most exacting manufacturing, testing and quality control standards. And it shows — in the fact that Leddicons average less spotting than other tubes!

Then there's geometry. The optimised electron optical design of Leddicons ensures the best possible geometry. Registration too is equally distortion free — we can, in fact, supply computer-matched sets for all three channels.



And what about microphony? With EEV's unique anti-microphonic mesh assembly, Leddicons provide the cleanest pictures — even from cameras operating in areas of high ambient acoustic noise.

As for choice, there's simply none better than Leddicons. That's because the range covers fully-interchangeable sizes and types to suit virtually every type of studio, EFP and ENG camera used in the world today.

When you add up all the facts about Leddicons, there is only one conclusion — namely, the definition of the best tubes for your camera.

But don't leave it at that.

Next time specify Leddicons for your new equipment and as replacements and find out what that definition really means in practice.

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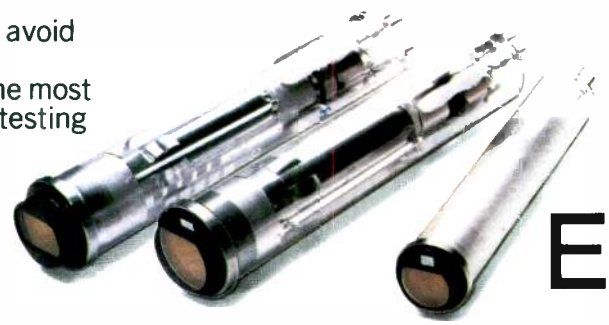

EEV Camera Tubes

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EEV, Waterhouse Lane, Chelmsford, Essex CM1 2QU, England. Tel: 0245 261777. Telex: 99103.

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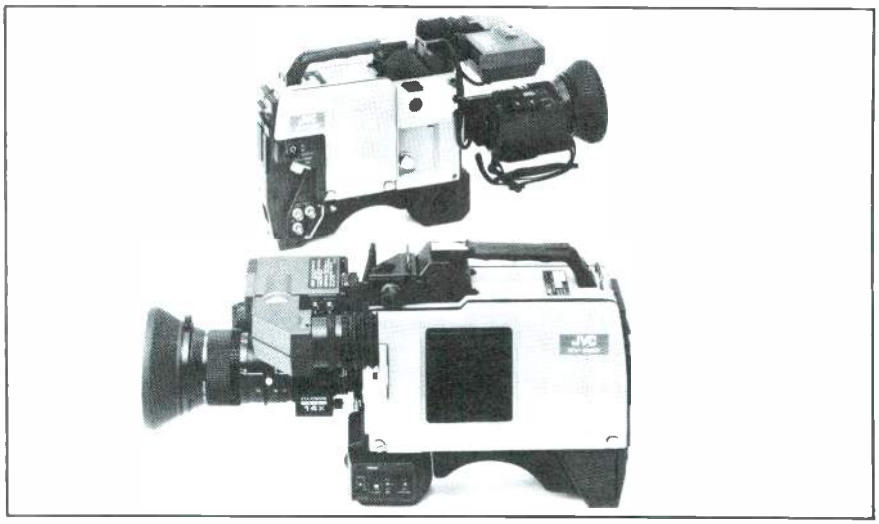


JVC KY-900/KY-950U

## JVC

**KY-310U.** A new level of automation, high resolution prism-optics and H4101 Saticons are included in a compact 9-pound camera, the KY-310U. Multiple 8-bit microprocessors add operational convenience along with an autoshift registration circuit for quick, 1-button registration without charts. A 12X lens provides integral macro facilities with a maximum focal length of 108mm. An optional 12X lens includes a 2X extender.

**ProCams.** The major difference between the KY-900U and KY-950U ProCam cameras is the pickup tube. With LOC diode-gun Saticons (KY-900U) or Plumbicons (KY-950U), prism-optics achieve an S/N ratio of 58dB typically with 2000 lux at f/4 or f/4.5, respectively. Autoshift registration removes setup drudgery without the use of special patterns. I/Q encoded NTSC color is available from auto color balance, auto beam control, auto iris and auto black circuitry.

**GZ-C3U.** A single ½-inch Saticon and 6X f/1.2 lens on the GZ-C3U camera provide 270TVL resolution pictures for recording on the HR-C3U video recorder. Combined into a single unit with an optional shoulder brace, the camera recorder system produces 45dB S/N pictures in the VHS-C Format at a price that allows it to be considered disposable, should conditions warrant.

Circle (355) on Reply Card

## NEC

**SPC-3.** Three ⅔-inch CCD devices attached to an f/1.4 prism require adjustment of registration only if a CCD device must be replaced. The operation is typically rated at a 200fc, f/4, sensitivity and outputs directly to ½-inch Betacam or M Formats and ¾-inch U-matic VCRs.

Circle (356) on Reply Card

## PANASONIC

**WV-555.** Y/I/Q component and NTSC composite video outputs from the WV-555 camera feed either M Format or conventional VCRs in ENG and EFP applications. The 3-tube, ⅔-inch design with prism-optics produces acceptable pictures to 8fc. A 53dB S/N ratio and 500TVL resolution are typical. Signal enhancement and a remote control unit are available.

*Continued on page 36*

# Introducing the New Electro-Voice RE30 omni and RE34 cardioid ENG/EFP microphones

## "Sophisticated microphones that simplify field production."

Action doesn't wait. The constant deadlines faced by news gathering and field production crews demand equipment compatibility, fast set-ups, simple operation and absolute reliability.

### Electro-Voice knows.

We've designed and built the broadcast microphones that have set performance and reliability standards, and we stand behind EV Professional Microphones with a warranty and service policy that's second to none.

### And EV listens.

Properly designed broadcast products are the result of pooled efforts. That's why EV devoted years to research, by working with network and local broadcasters to engineer all of the desired features into a pair of rather revolutionary new microphones for ENG and EFP.

EV confirmed that field microphones should incorporate low handling noise, resistance to humidity and moisture problems, extreme durability, and the same reliability and level of performance that the industry has become accustomed to expect from EV microphones like the phenomenal 635A and RE20.

### Introducing the RE30 and RE34.

Because remotes present a variety of acoustic environments, EV engineered the RE30 with an omnidirectional pickup pattern, and the RE34 with a cardioid pattern. Except for their polar patterns, each model has the same features.

Both the RE30 and RE34 have switchable outputs—either line level or microphone level. No longer will field crews

be stuck without the right signal level. A flick of the recessed switch adjusts the output level, producing instant compatibility without the need for extra equipment or cables. The low distortion line-level amplifier allows direct interface with line-level inputs such as those common on microwave and fiber optic transmitters.

Additionally, the RE30 and RE34 will drive and hold telephone lines*.

*F.C.C. approved interconnect may be required.

Each microphone includes a low-distortion limiter which functions at either output level.

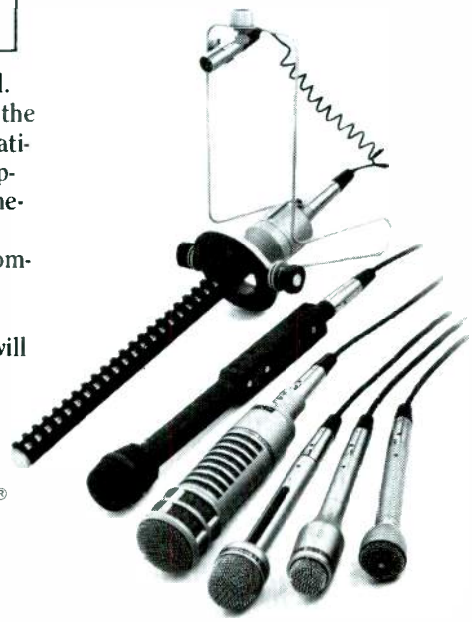
The RE30 and RE34 can be powered by either phantom power or a standard, available anywhere, 9-volt "transistor radio" battery. With both power sources present, the battery becomes a redundancy powering system that instantly and silently takes over if ever required.

An LED, mounted so as to be easily visible to the talent only, serves several important functions... it shows the presence of phantom power, monitors battery condition, and offers the world's first hand-held "tally light" to signal on-air personalities from off-camera.

### Get the whole story.

No advertisement can hope to explain all of the features of these incredible new microphones. Complete engineering data sheets describing the many features and benefits of the RE30 and RE34 are available free upon request.

Many Electro-Voice Professional Microphone Dealers can arrange a hands-on trial at no cost to you. For more information please write to: Greg Silsby, Market Development Manager/Professional Markets, Electro-Voice, Inc., 600 Cecil Street, Buchanan, Michigan 49107.



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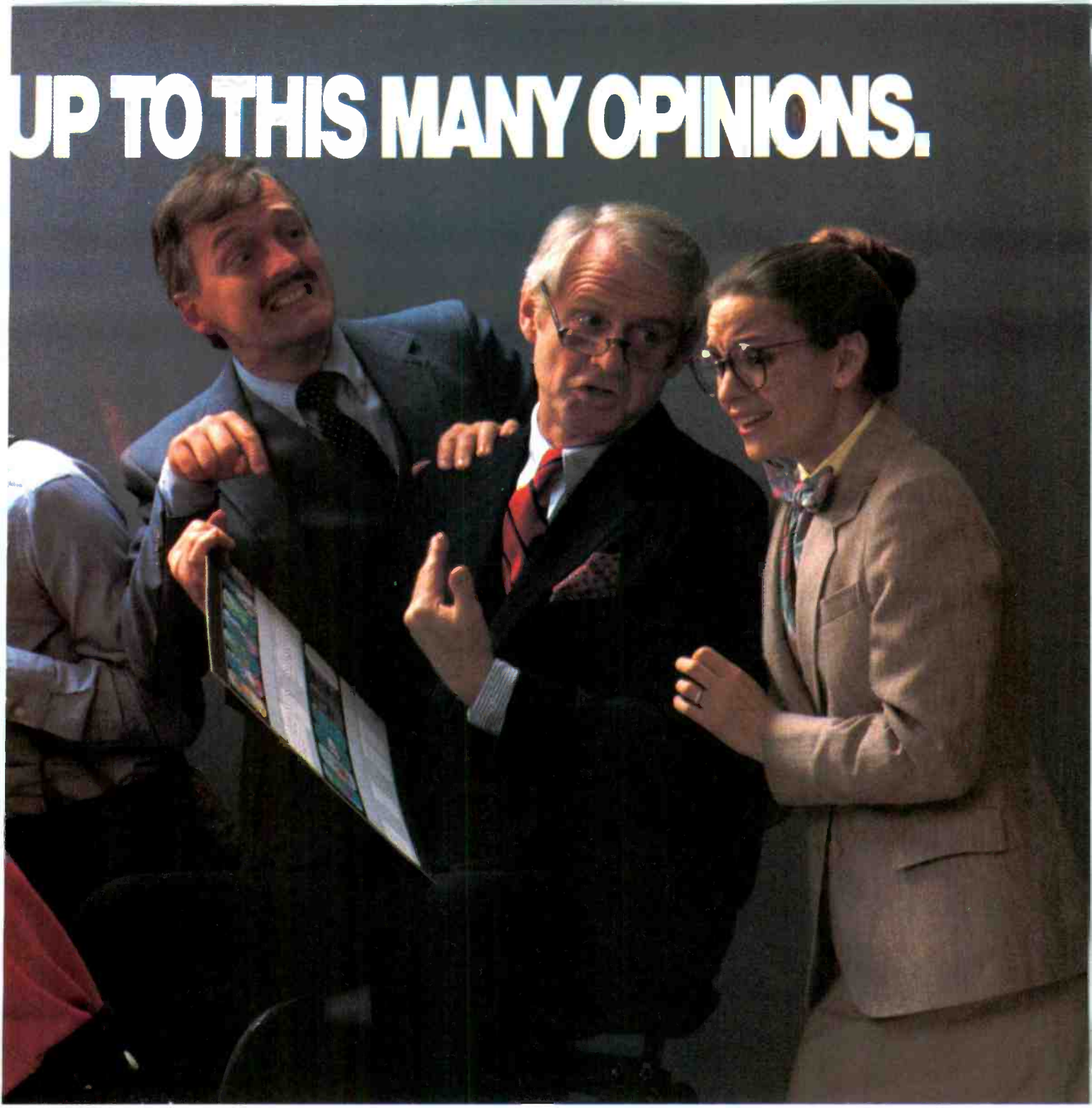
Every opinion expressed in an editing session adds up to more starting, stopping and rewinding of the tape. And that can lead to reduced picture quality, unless you've got new Scotch™ 480 one-inch video tape working for you.

An advanced magnetic dispersion, consisting of a totally new oxide, binder and lubrication system on Scotch 480 video tape keeps your productions looking good through the toughest editing sessions. In fact, 3M lab tests have shown 480 video tape capable of delivering *over 1,000 edits from the*

# UP TO THIS MANY OPINIONS.



*same preroll point,* with no significant reduction in playback picture quality.

If your video requirements call for a tape with that kind of durability and image quality, call 1-800-328-1684 (1-800-792-1072 in Minnesota) for more information about Scotch 480. Your productions will look better and so will you.

Magnetic Audio/Video Products Division/3M.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**1" VIDEO TAPE.**
**LASER TESTED**
**FOR CONSISTENCY.**

3M hears you...

3M

*Continued from page 32*

Panasonic WV-555

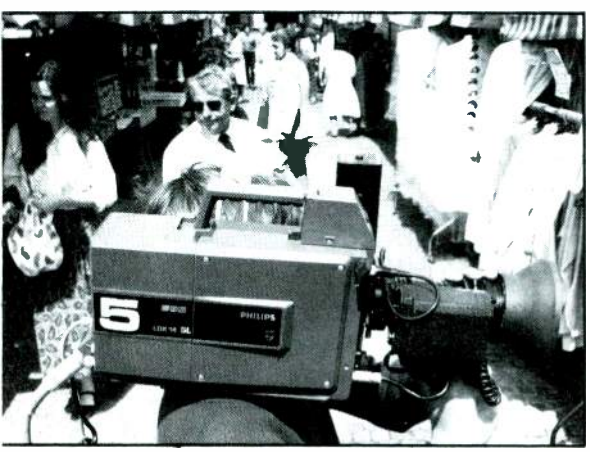
**WV-888.** Three ⅔-inch ST-MG Saticons and a prism-optics system are typically rated at 200fc, f/4, in the WV-888 camera. S/N ratio of 57dB and 600TVL resolution combine with autocentering and color balance circuitry. If desired, an optional remote-controlled panel allows RGB outputs, as well as R/B gain and pedestal adjust, master gain/pedestal control, and both H and V R/B centering.

**RECAM.** Saticon and Plumbicon versions of the AK-100 camera offer Y/I/Q components and encoded NTSC color signals to ½-inch M Format or full-bandwidth VTRs. The capability for working with any recorder is included in the gen-lock adapter. Based on ⅔-inch tubes, the camera output has at least a 58dB S/N ratio and is rated at 200fc, f/3.5 in the Saticon model.

If required for studio or remote-controlled applications, the RECAM can operate on a 1000-foot cable, with no adjustments required if the cable length is changed. Studio recorder units allow a production interface to composite video systems, although component video studio equipment is available.

**Circle (357) on Reply Card**

## PHILIPS



Philips LDK-14 SL

**LDK-14 SL.** Improvements to FET circuitry, contour enhancement and automatic functions along with LOC diode-gun Plumbicons result in improved operation with the LDK-14 SL camera. Also, an optional RGB transmission system provides RGB outputs from the remote control unit, if the application requires. The LDK-14 S does not feature the LOC tubes, but does include the other updated capabilities.

**LDK-44.** Three ⅔-inch Plumbicons with f/1.8 prism-optics allow the LDK-44 modular camera to produce 400TVL pictures in 120fc illumination with a 50dB S/N ratio. VLS and CLUE features simplify camera setup procedures whether in the studio or the field.

**Circle (358) on Reply Card**

## RCA

**TKP-47.** Three ⅔-inch diode-gun, lead-oxide tubes and prism-optics result in a portable camera that plays a companion role to the TK-47 studio camera. Extensive use of microprocessor and LSI circuitry enhances simple setup and operation. For the system application, the TKP-47 may operate from TK-47 control equipment.

**Hawkeye II VRC.** The Hawkeye II camera is compatible with all HC-I accessories and includes an integral viewfinder, external tally indicators, a T-bar handle and improvements in component signal performance. All interface equipment, which allows the HC-I to be used with various recorders including the M Format ColorTrak and Betacam systems, may be used equally well with the Hawkeye II model.

**CCD camera.** Introduced first at NAB-'83 and subsequently shown at Montreux and the November SMPTE convention in Los Angeles, RCA's developmental CCD camera produces component video signals with exceptionally low noise levels. Very high contrast scenes are handled with ease by the camera system, without typical trailing. For demonstrations, the camera's output has been recorded on a modified TR-800 recorder in a component format.

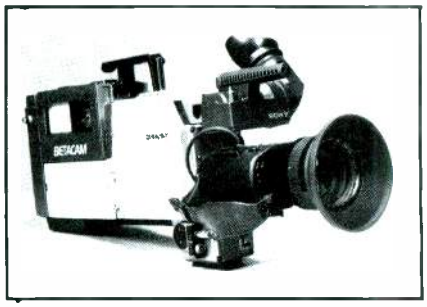
**Circle (359) on Reply Card**

## SHARP ELECTRONICS

**XC-900D.** Following in the XC-700 and XC-800 series, the XC-900D incorporates three diode-gun Plumbicon pickup tubes for quiet, low light-level performance. To add versatility to multicamera applications, triax cable is available for greater distances between the camera and an optional base station. With many automatics and linear matrix masking for improved color matching, the XC-900D is economically priced.

**Circle (360) on Reply Card**

## SONY



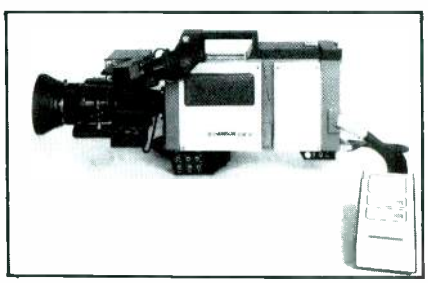
Sony BVP-3 Betacam

**Betacam.** Various interfacing packages are now available for use with the Betacam BVP-3 3-tube camera and BVP-1 single-Saticon unit. Although typically used with the BVV-1 Y/R-Y/B-Y component recorder, the adapters allow the cameras to be used with conventional recorders and other cameras to be used with the BVV-1. The cameras typically operate in 200fc illumination at f/4, producing a 57dB S/N ratio with greater than 650TVL resolution.

**BVP-330A.** Improvements to the deflection system assembly and focus modulation allow the BVP-330A to develop higher quality pictures than before. A choice of multicore, fiber-optic or triax cable is possible between the camera head and the remote control unit if stand-alone operation is not desired. A 600TVL resolution results from the 3-tube, ⅔-inch Plumbicon system with 200fc illumination.

**Circle (361) on Reply Card**

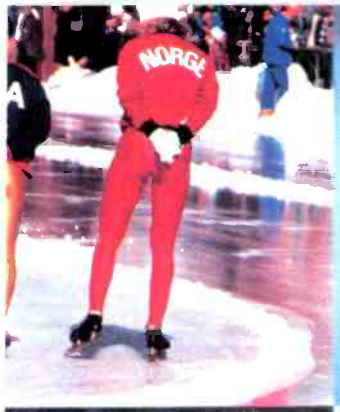
## THOMSON-CSF



Thomson-CSF MC-613

**Betacam VRC.** Either a 1-tube MC-611 or 3-tube MC-613 (Camescope) camera may be attached directly to a VT-611 Beta component recorder for easy ENG operation. Alternatively, either camera also may be used with other VTRs with the NTSC output capability. In the studio, the VT-615 recorder backs the Betacam format with composite and component video dub connections adding versatility to the production.

**Circle (362) on Reply Card**





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# The Tape Behind the Olympics


Ampex video tape.
Winning quality worth broadcasting on 196 1" video tape and 19? ¾" videocassettes.

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# ENG/EFP cameras:
## A guide to support products

By Carl Bentz, television editor

The choice to use particular types of ENG/EFP camera support equipment is dictated to a great extent by the type of production. For example, the camera angles and positioning appropriate for a rock concert vary widely from those expected for a political rally, news conference, local parade, theatrical production, big game or fast-breaking news event. Keep in mind when choosing to use support equipment that such equipment may restrict camera angles and positioning and operator mobility.

Two advantages of hand-held ENG cameras are their flexibility and mobility. Obviously, a self-contained camera recorder setup allows the most creative freedom, if subsequent editing is possible or if on-camera microwave is being used from several cameras to a production headquarters location. Camera cable that ties the head to the control center restricts such freedom, and support devices place additional limits on flexibility and mobility.

### Lenses and stability

The introduction of longer focal length lenses for small cameras has added to the question of how mobile such an ENG camera can be. For fast-action productions, where a certain amount of camera support instability can be tolerated, the hand-held mode (self-contained or cabled) is usually acceptable. Often, however, an extended scene from a single camera location with a long lens requires a highly stable support, not typically possible with a camera-on-the-shoulder mount. The longer the focal length of the lens to be used, in general, the greater the support stability must be for a shot to be easily viewed. For example, in a rock concert setting, with the talent gyrating around the stage, the long

**Table I.**
**Support equipment manufacturers**

Arriflex . . . . . (370)
Mitchell geared heads
Cinerent camera crane

Bogen Photo . . . . . (371)
Fluid heads
Ball levelers
Tripods

Bush & Millimaki Services . . . (372)
Tripods
Heads

Camera Dollylite Systems . . . (373)
Camera cart

Cinema Products . . . . . (*)
Steadicam III

Camera Mart . . . . . (374)
Rental Ronford tripods
Heads

Cine 60 . . . . . (375)
Body stabilizer

Cohu . . . . . (376)
Remote control camera mounts

Comprehensive Video Supply (377)
Bilora tripods and heads

Continental Camera Systems (378)
Body mount stabilizer

David & Sanford . . . . . (379)
Fluid heads

ENG Helicopter . . . . . (380)
Helicopter camera stabilizer

Egripment . . . . . (381)
Mini-crane

Evershed Power Optics . . . . . (382)
Servoed pan/tilt heads.

F&B/CECO . . . . . (383)
Tripods
Heads

Alan Gordon Enterprises . . . . (384)
Supergrip mountings

Gruber Products . . . . . (385)
Camera carts

Karl Heitz . . . . . (386)
GITZO fluid and spring heads
Tripods
Quick-release mountings.

Image Devices Int'l. . . . . (387)
Cranes, tripods, heads
Helicopter stabilizer

Innovative TV Equipment . . . . (388)
Tripods
Torsion, cam, hydro heads
Dollies, Pedestals
Miller products

Javelin . . . . . (389)
Remote control heads

Kennett Engr. . . . . (390)
Telecam tripod/head/dolly
Body mount stabilizer

Klein + Hummel . . . . . (391)
PortaBrace body mount

Lee Lighting America . . . . . (392)
Cranes
Dollies

Lee-Ray Industries . . . . . (393)
Camera carts

Listec TV Equipment . . . . . (394)
Pedestals
Tripods
Heads
Crane attachments

Manfrotto Lino, SPA . . . . . (395)
Tripods
Heads

Matthews Studio Equipment . (396)
Cranes
Remote control heads
Tripods
Heads
Dollies

O'Connor Engr. Laboratories (397)
Tripods, heads, pedestals
Hydroped

Omnimount Systems . . . . . (398)
Camera mountings

QuickSet . . . . . (399)
Fluid/cam heads
Tripods
Pedestals
Friction heads
Dollies

Ronford-Baker Engr. . . . . (400)
Fluid heads
Tripods

SEACAM . . . . . (403)
Underwater camera housings

SFENA . . . . . (404)
Aircraft stabilizers

Sachtler GmbH . . . . . (401)
Fluid heads
Tension/spring heads
Tripods

Survey & General Instrument (402)
Body mount stabilizer

Universal Fluid Heads . . . . . (405)
Fluid heads
Tripods
Steadipod body stabilizer

Velbon Int'l. . . . . (406)
Tripods
Spring heads
Camera carts

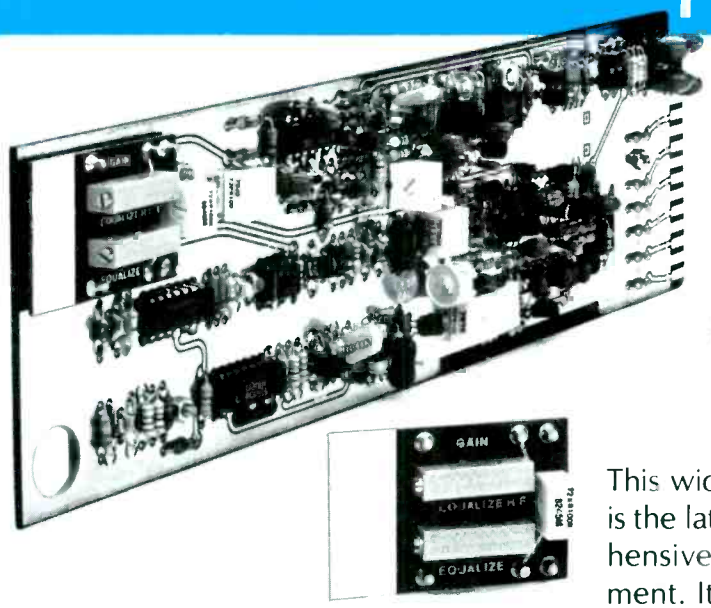
VideoTeleCom . . . . . (407)
Barber Baby Boom

Video Presentations Equipment Ltd. . . . . (408)
Pedestals

W Vinten Ltd. . . . . (409)
Pedestals
Portaped
Crane arm
Dollies
Tripods
Heads

*For more information, write to Cinema Products Corporation, 2037 Granville Ave., Los Angeles, CA 90025.

# HIGH PERFORMANCE

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|---|---|
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| | |
|---|---|
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| Signal (3.58 MHz) | > 48 dB |
| Load | < 0.05 dB/load at 10 MHz<br>< 0.15°/load at 3.58 MHz |
| Output DC | < ±25 mV at back porch |

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| | |
|---|---|
| Delay | 25.4 ns (32.7° at 3.58 MHz) |
| Adjustment range | typically 6° at 3.58 MHz |

**Power Requirements**

| | |
|---|---|
| Total power dissipation | < 2 W |

**Performance**

| | |
|---|---|
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| Differential phase | < 0.1° 10% to 90% APL |
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lens picture from the back of the hall could conceivably be generated from a hand-held camera without a tripod.

With the decision made that support is required, additional thought must be given to the type of support equipment needed. Environmental conditions and location of a production area must play a part in that decision. Weather conditions may preclude extensive equipment setup time for the fast-breaking news clip, but a stiff breeze during a more subdued production could produce disasterous results without a sturdy mounting arrangement. Elevated camera angles may involve precarious positions that will not allow the use of even a tripod, while a boom-mounted camera on a vehicle or wagon would suffice if the action will be relatively confined to a terrain acceptable to the boom support. At the same time, if the restrictions placed on the mobility by a tripod can be accepted, it will offer support on a sharply sloping camera position, using the adjustable leg feature to level the camera.

The more unconfined the action may be, the more unrestricted the camera operator must also be, in terms of support equipment, in order to cover the activity properly. The demands and restrictions placed on the coverage are of prime importance, resulting from the type of production, environmental factors and directorial desires.

In order to handle the wide variation of production possibilities, support equipment manufacturers have developed an equally wide spectrum of devices. Most common are tripods, with easily operated pan/tilt heads designed for flexible camera movements. Less common equipment for station ENG/EFP production includes mobile supports, ranging from vehicular or track-mounted crane/boom systems to remotely controlled vehicular and helicopter-mounted equipment.

The widest varieties of support equipment fall into the tripod and head categories. Tripods, for example, may include elevator columns with an attached pan/tilt head. Alternatively, they may require ball/claw leveling devices to which other equipment attaches. Tripod legs may be made of wood, metal or composition material, chosen by operator preference. Those familiar with film equipment might prefer wooden tripods to metal alloy or composition ones. However, the newer alloys and composite materials are typically lighter than wood. On the other hand, in widely varying thermal conditions, the metallic materials possess a greater expansion/contraction factor, thus conceivably making adjustments more difficult than with wooden- or composite-legged tripods. The carbon fiber materials introduced by Sachtler GmbH several years ago, however, seem to fill many requirements by being lightweight, structurally tough and somewhat improved in regard to thermal considerations.

Pan/tilt heads also provide a number of choices. The most prevalent of the new products are the fluid pan/tilt heads. Generally, a smooth action is provided in all camera movement with the fluid device, with a certain amount of damping action available to avoid sudden undesired motion. Drag adjustments are available to simplify the operator's task in keeping the right shot over an extended time period. Alternatively, other means of pan/tilt action are given in spring-damped, tension and counter-balanced devices.

How should you select the support equipment for your particular, perhaps peculiar, production problems? To help answer that question, Table I lists manufacturers and their support product categories. Reader Service Numbers are also provided. For more information, check the 1983 *Buyers' Guide* issue.

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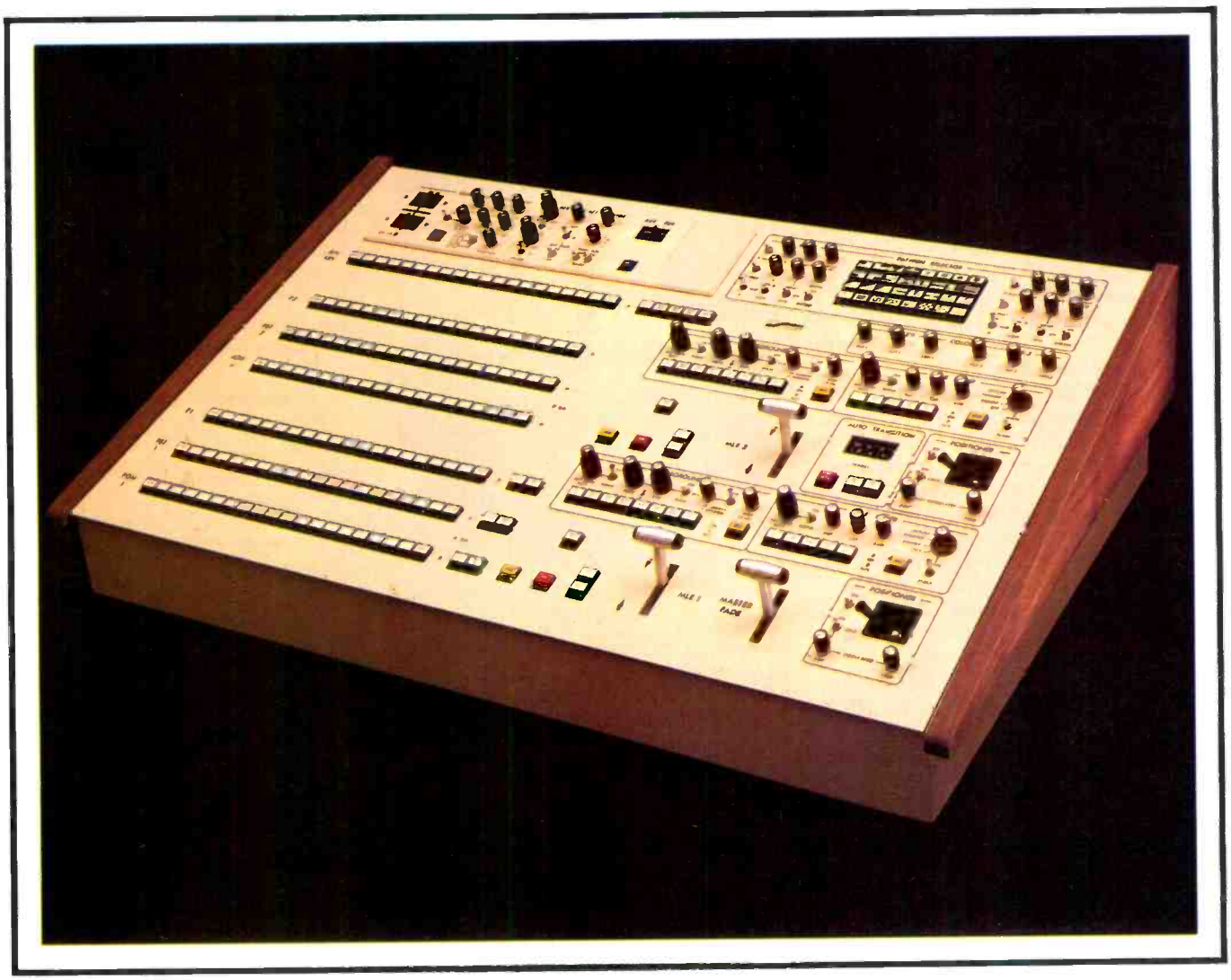

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# RENG: Catching up with TV

By Richard Rudman, chief engineer, KFWB Radio, Los Angeles, CA

A number of things in life seem to defy common sense. Within the world of radio broadcasting, one such thing that has always intrigued me is why our friends in television seem to have left radio in the dust concerning our relative abilities to get programs from the field to the studio.

As far as audiences are concerned, there is little impeding the progress of pictures from the scene of a brush fire or shoot-out. Many of us in radio broadcast engineering are routinely reminded of this perception by some of our managers. When these managers watch television, they see action "live from the scene." They sometimes conveniently forget the basic economics of the situation that makes TV remote vans and manned ENG receive control points, staffed by technically trained people, possible.

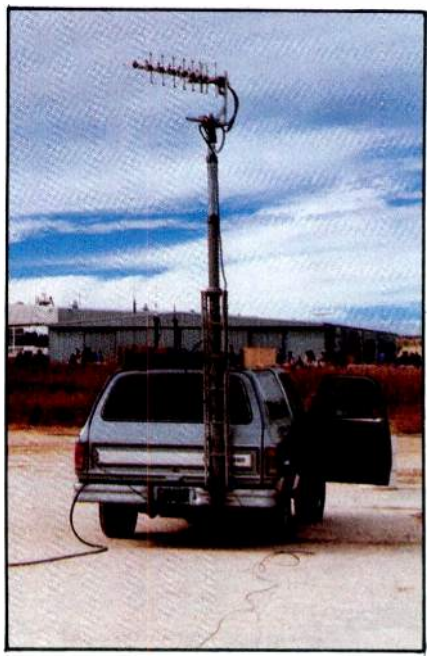
If you are commanded to set up RENG for your station and the command includes the phrase, "We want our reporters to sound like they are really there, not like they are talking on the telephone," you are going to have to deal with this perception and the budget constraints that the economics of radio impose. It can be done, though.

If you have never had experience with Part 74 of the *FCC Rules*, which governs ENG for television and RENG for radio, your first job is to become more intimately acquainted.

Radio ENG can take advantage of many technological advances, without asking the sales department to raise the spot rates to $4500 a minute. State-of-the-art remote pickup, from voice-grade dispatching to field programming with studio quality, can make this possible.

### Planning a system

To begin with, any system should be based on the precise needs of the particular station. Have a meeting of all people involved with the radio system to determine their expectations. If your format happens to be "all news," for example, the news department's expectations and your mission are already fairly well-defined. Whatever you hear at such gatherings, resist the urge to be negative. Hear everyone out. Even if you know that it is impossible to provide separate frequencies for each reporter, 75W hand-held radios or solid coverage from every underground garage in town, at least listen to what everyone would like the system to do. Most systems now on the air were *not* designed by having such meetings, and some serious system shortcomings and misunderstandings could have been averted had they taken place.



The KFWB 4-wheel-drive mobile unit/repeater station features a versatile 40-foot pneumatic mast.

To avoid sounding negative, you can honestly say that it is not possible to put a system budget together until you know what the station wants to do with it. There may be a way to provide coverage from those *underground garages*, but the cost of doing so may convince those making the request that they should reconsider.

Your market has a lot to do with the system you will design. If you are in a region spread out over 10,000 square miles, such as Los Angeles, your system is going to be different from a tightly clustered urban area encompassing only 1000 square miles. The number of stations in your market that do RENG and their level of sophistication will have a bearing on your activities, also. If you are in a busy region, again using the Los Angeles example, you may find few or no available frequencies. In such cases it pays to become active in your local frequency coordinating committee. Coordinating committees can let you know who is on what channel and what compatible sharing situations might exist. They also can help work out differences that arise in accommodating too many users in a limited amount of spectrum. Ideally, they facilitate licensee-to-licensee contact.

### Frequency coordination

The frequency coordination process is a complicated one that requires careful thought and planning, and lots of time. Because RENG channels are used on a shared basis, receipt of a license is no guarantee of interference-free operation, particularly in the larger urban areas of the country. Broadcasters of a given geographical area rarely have to decide whether they should become involved in frequency coordination efforts. Generally, if coordination is needed it is obvious to all concerned.

The main driving force behind coordination efforts has been the Society of Broadcast Engineers (SBE), which has set up a National Frequency Coordinating Committee to encourage local efforts and to provide whatever support might be required. To date, more than 67 separate frequency coordination committees have been established in cities across the country to manage their own affairs. Each coordination group operates as an independent entity.

The SBE's National Frequency Coordinating Committee (NFCC) has an ongoing goal to make non-technical people associated with the industry aware of and responsive to the need for coordination. The effort, dubbed *Operation Golden Rule*, has made available a video teaching tool titled, "Liveshot: ENG in the '80s." The tape, produced by Westinghouse Broadcasting and donated to the NFCC, is designed for orientation and training of non-technical people involved in ENG. The tape is available in VHS and BETA formats and can be loaned to local frequency coordination groups and industry organizations, such as the Radio-Television News Directors Association.

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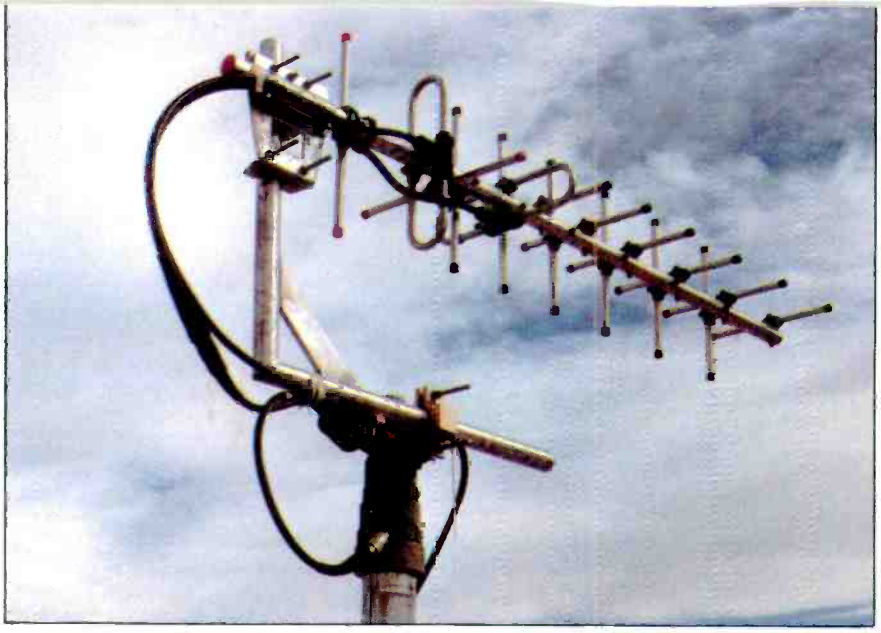

Shown is a close-up of the cross-polarized yagi transmitting antenna used on the KFWB mobile unit/repeater station.

The NFCC also is seeking coordination information from other communications services, such as cable television. The cable industry has been asked to join existing broadcast coordination groups to round out the spectrum management effort. This coordination will involve the shared 13GHz channels, in addition to cable's CARS channels adjacent to the shared 13GHz spectrum, to limit adjacent channel interference problems.

The NFCC hopes to promote cooperation between the broadcast and cable industries. Although not too many people like to think about it, cable will someday become active in ENG and RENG for remote-location events. If present trends continue, the distinctions between cable and over-the-air broadcast will further diminish, resulting in the need for more cooperation and communication.

The 1984 Olympics and national conventions will provide excellent opportunities to test a number of coordination ideas. Perhaps the most difficult effort will be working out the myriad of problems associated with radio and TV broadcast coverage of the Los Angeles Olympics in an area already supersaturated with Part 74 activity.

The success of coordination in any market requires the interest and support of engineers, managers and operators. Enlightened cooperation can benefit everyone, without compromising competition.

### Creative coordination

Your local frequency coordination committee might consider doing what we did in Los Angeles when the number of 450MHz RENG users exceeded the number of channels. We came up with a plan to split each N1 50kHz channel into two 25kHz channels. This more than doubled channel usage because the center channel could still be occupied, provided there was enough physical distance between users. With the San Diego market "next door," we had the opportunity to test this out. It worked.

Our committee was asked by the FCC to file a report on this channel splitting waiver so that its success could be evaluated. Several other large markets now are considering implementation of this plan.

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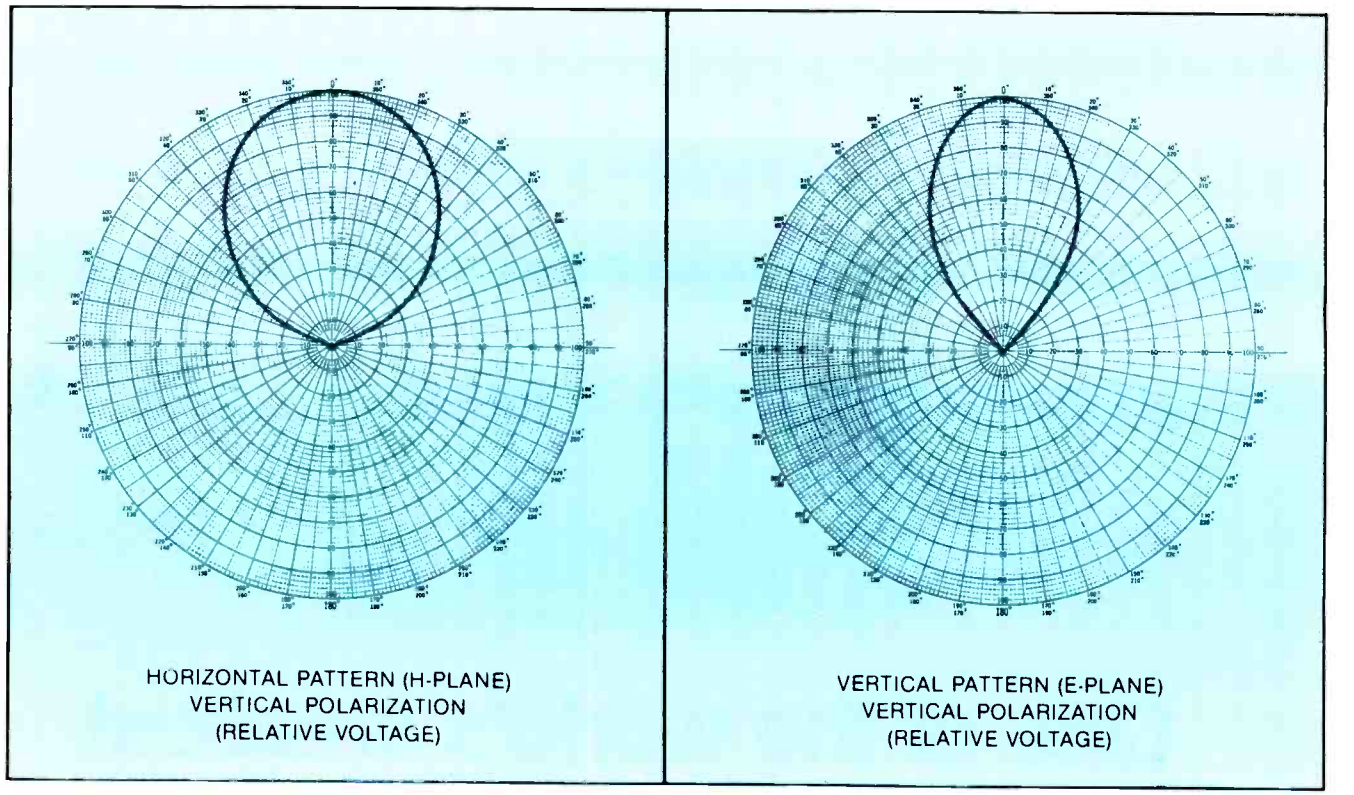



Courtesy of Scala Electronics

**Figure 1.** Shown is the radiation pattern for a high performance log periodic antenna designed for RENG use. This antenna, a Scala Electronics CL-400, is small enough to be transported by remote crews and may be stacked for greater gain and directivity in fixed installations.

Broadcasters are not the only users of the 160MHz and 450MHz RENG frequencies. Police, business, paging and amateur systems bracket the two 1MHz slices open to use, for example, in the 450MHz band. Also, the amateur band below 450MHz is shared with government radar in some parts of the country. From the characteristic *buzz saw* of radar to the page, "Dr. Jones, please call your office," interference is a sad fact of life to those engaged in RENG today. We are resigned to such interference getting worse in the future, rather than better.

### Coordination methods

Time allocation is the most obvious frequency coordination method for an area saturated with RENG activity. In this method, a particular station is granted use of a specific channel for a period of time, after which the next station may use it. Time allocation works well for planned remote broadcasts, but has obvious drawbacks for spot news coverage. More sophisticated requirements demand higher performance, and in some cases, custom-designed gear.

The first rule of frequency coordination is to use only the effective radiated power (ERP) necessary to do the job. There is no excuse for putting 15W into the air when 5W will provide full quieting of the receiver. Directional antennas are a good idea from efficiency and coordination standpoints. The use of a high gain antenna, such as the broadband log periodic design shown in Figure 1, makes it possible to achieve a much greater ERP for the same transmitter power. Of equal benefit in a crowded urban area is the elimination of any non-essential radiation. Through the use of directional transmit and receive antennas, stations create more secure channels by placing the radiated energy where it will do the most good, and rejecting unwanted signals from other directions.

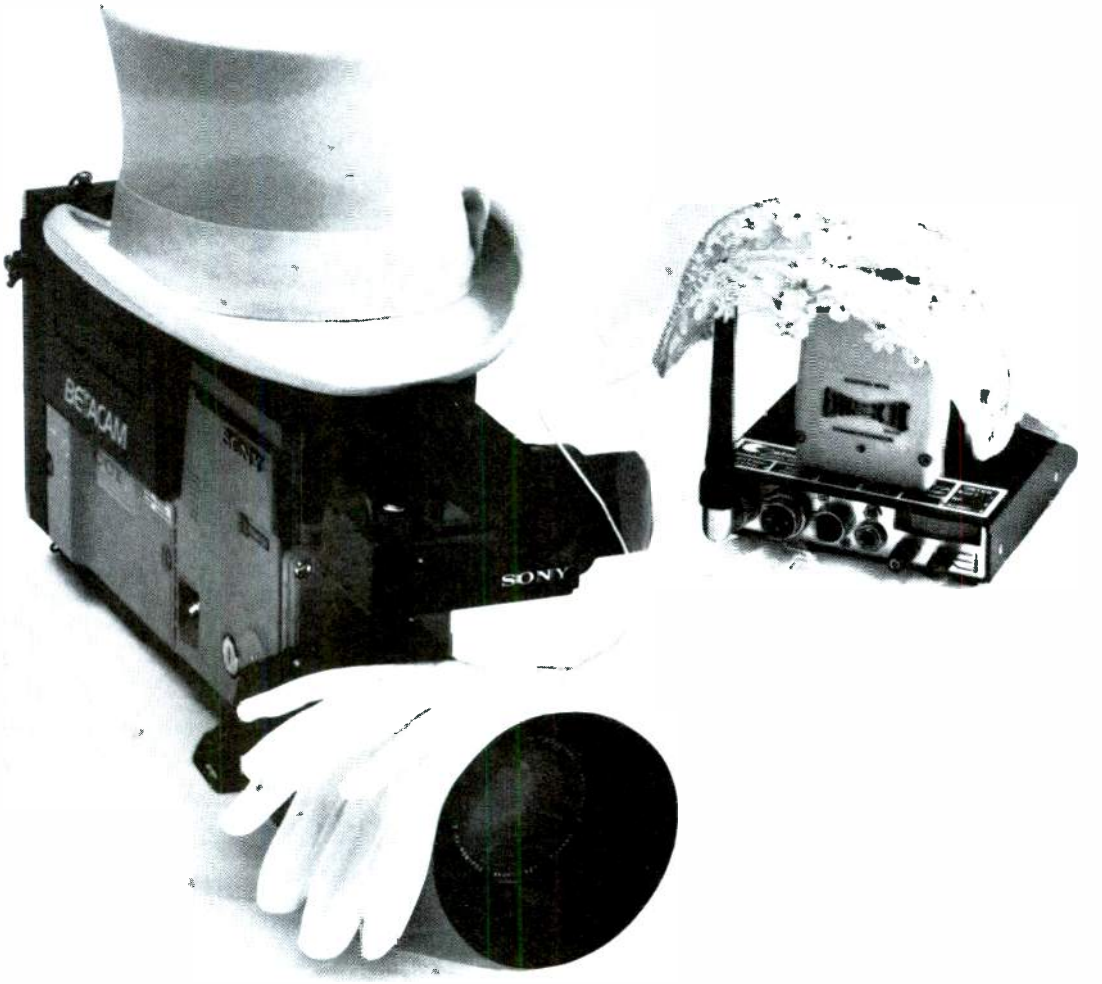
A simple and sometimes effective coordination tool is cross-polarization. Two stations on adjacent frequencies may achieve as much as 25dB isolation through the use of different polarizations, which are matched at the receive ends. Cross-polarization generally results in varying degrees of success, depending on the frequency of operation and surrounding terrain. Line-of-sight paths usually will provide good results, but urban centers with their highly reflective metal buildings will cause polarity shifts in the transmitted signal that may significantly reduce the benefits of differing polarizations.

Path engineering is seldom done for RENG activities because of the transient nature of such broadcasts. Rough estimates should be made of geographical areas of interest before attempting remote feeds, however. It is worth the time to conduct a coverage survey of the primary areas of interest for RENG activities to determine which locations provide good or marginal performance. A little effort ahead of time will save headaches and dead air later.

Although it is the most basic frequency coordination tool, transmitted power output limiting is not accomplished easily in the field. Few of the popular broadcast remote equipment manufacturers provide a means to continuously vary the RF output level. Modification of gear is not recommended because of the possibility of introducing spurious emissions in the output, and the likelihood of invalidating the equipment's type acceptance. Short of having a built-in power control adjustment, the next best method to vary RF input to the antenna is using transmitters with differing power output levels, or a single low power transmitter with various medium and high power booster amplifiers.

Site selection for repeaters and receivers should be considered separately because of increasing interference levels at multiuser locations. The World Trade Center in New York and Mount Wilson in Los Angeles are good *talk-out* sites, but terrible receive locations. If you augment your repeater system with satellite receivers located at quiet areas with no transmitters nearby, you have bought yourself interference protection that no number of cavities or receiver front end headroom can provide. Leased common carrier wired or wireless channels bring the receiver audio

# The Perfect Marriage

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back to the studio, where you can implement manual or automatic *voting* to select the receiver with the best quality. This concept will lead you into a cellular receiver mode if applied to your total 2-way coverage area. Similar to the latest common carrier radio systems based on cellular technology, you can then use low power hand-helds or vehicle transceivers with excellent results.

As private common carriers begin to install competitive audio circuits in many markets, you may have cost-effective alternatives to traditional telephone company audio circuits and their associated high cost. If your radio facility is co-located with television, your video compatriots may be able to back haul your audio on one of their microwave system's subcarriers with full 15kHz fidelity. If you are really creative, you may even find one or more TV broadcasters not associated with your company that might be willing to install additional audio subcarrier equipment at cost, provided you make a small contribution to site rental fees they incur.

Once you know what level of quality your system is expected to provide, you can give some thought to what equipment to use. There are several alternatives available, with the promise of more on the horizon.

Whatever audio bandwidth you require, there are several things to keep in mind when looking at receiver specifications. The following is a checklist of items to look for that will give you a good idea how your equipment selection can make or break your system:

The mobile communications gear used on a typical KFWB news vehicle is shown.

- **Has the receiver manufacturer provided enough dynamic range and headroom to allow your system to deal with strong adjacent channel signals, as well as weak and overload on-channel signals from your transmitters?** Think of any RF receiver as you would an audio amplifier. A receiver with inadequate headroom will clip and yield distortion similar to an overloaded audio amplifier. Look for wide dynamic range active devices in the receiver front end, such as gallium arsenide field effect transistors (GAsFETs), as one indication that this has been considered.


*The heart of the 632 Series image processing system, a 4:1:1, Component-coded Frame Synchronizer.*

• **How will the receiver react to a preamplifier and cavity preselector network ahead of it?** Similar to cascaded audio amplifiers, RF preamplifiers can add sensitivity, but also can cause overload conditions. Preselectors often are necessary because the 454-455MHz land mobile paging band often places 1kW ERP transmitters less than 1MHz away from the 455-456MHz RPU band.

• **Are ripple and skirt symmetry through the IF passband held to less than 2dB and ± 1kHz, respectively?** In systems using low FM modulation indexes (approaching a ratio of 1.0) that depend on full quieting for full audio fidelity, these specifications are especially important.

• **Is the proposed equipment designed to work in unheated and uncooled mountain-top locations?** Modifying rugged and reliable commercial 2-way equipment is one way to achieve this important specification, along with the previous three items. Temperature effects on frequency-determining elements—as well as on accessories such as cavity filters, pre-selectors and preamplifiers—all affect performance.

• **Is the equipment designed and documented so that it can be serviced in the field?** Some mountain-top site owners may not allow technical people to service equipment installed in their buildings. In any event, proper documentation, designed for field service, is an important consideration. (You may not have the luxury of enough time to return equipment to the factory for service.)

In addition to setting up your program audio system, another important consideration is remote crew communication with the home base.

Although Part 74 allows cues and orders necessary for programming to be carried out in the R, S and N channels before and after such programming, you might need separate dispatch capabilities. A large fleet of mobiles requiring coordination for big stories is one example. You also may need to provide air cues over your 2-way system while on tape delay to talent in the field.

If your station wants an intercommunication system that cannot be monitored by the competition, consider an 800MHz trunked radio system. No scanners yet exist for the 800MHz band, and the multifrequency nature of trunked radio makes eavesdropping difficult. A 5- or 10-channel trunked repeater system acts like a small telephone exchange in which the number of users (telephones) exceeds the number of channels (trunk lines). Telephone theory is used to predict the *busy* level you can expect during heavy radio traffic times, and 3-minute time-out timers usually are included in mobile transmitters to enforce time limits. Systems are allowed to tie into the regular telephone system at hill-top repeater sites or at trunked base stations. Broadcasters interested in this system can contact their local land mobile shops to determine if 800MHz trunked radio service is available in their areas.

In some cases you may be able to design and license a UHF business radio system for RENG dispatch. The advantage of being the only one on the channel is that you will not encounter busy signals, as you might occasionally in a trunked system. As with the trunked network, no programming is allowed. This technique has been tested by several people over the years, with the FCC yielding no ground on this point so far.

Given careful planning and sufficient financial resources, RENG can not only *match* TV news coverage, but *surpass* it. Innovative RENG operations at many stations across the country have shown that radio does not have to take a back seat to television.

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**Editor's note:**
The author is chairman of the National Frequency Coordinating Committee, under the auspices of the Society of Broadcast Engineers.

# RENG: Getting the signal back

By Jerry Whitaker, radio editor

Stations wishing to become involved in RENG or wanting to expand their current operations have a wide variety of equipment from which to choose. Prices for this gear cover a wide span as well, making it possible to build a system that fits the station's needs and budget.

News stories can be returned from the field to the studio through wired telephone company dial-up lines or dedicated broadcast loops, or wireless transmission systems. The method chosen will depend on a number of factors, including the location of the event, the availability of telephone lines and the duration of the broadcast. Short transmissions are handled easily by remote pickup unit (RPU) gear. Meetings, speeches and sporting events, however, are probably best handled by a wired arrangement. The amount of frequency congestion in the origination area also will have an effect on which method a station should use to provide the best reliability. Urban areas in which secure RPU channels are difficult to find would probably be best-suited to a wired link.

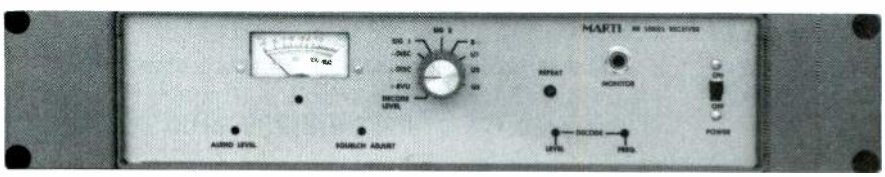
## Wireless systems

RENG has come a long way since the narrowband walkie-talkie days, when a 5W "portable" unit would be as big as a briefcase and weigh 35 pounds. Today's gear is small, lightweight and can deliver excellent audio quality. Stations now can go into the field for news and special-event programs and maintain studio-like sound. The audio quality of remote broadcasts is more important than ever before, because radio station transmission systems and receivers are constantly improving. Further, audiences are becoming more discriminating and demanding of news operations. Today's competitive marketplace demands more than just sound from the field. It demands clean audio with good frequency response. TV news has shown viewers that this is possible, and has conditioned them to expect it.

Space limitations prevent a summary of all RENG equipment made by major manufacturers, so what follows is a representative sampling of some units designed for use in the field.

**Marti Electronics RPT-2.** The Marti RPT-2 hand-held transmitter provides 2.5W continuous power output in the 150MHz or 450MHz RPU bands. The transmitter includes an internal nicad battery and battery charger for portable operation. The unit can be powered by the ac line with a detachable cord or by an external 12Vdc supply. The RPT-2 is capable of dual-frequency operation through the addition of an optional second crystal. Frequency selection is accomplished with a front-panel switch. A built-in switchable subaudible tone generator makes the transmitter capable of keying an automatic relay station, as provided for in Part 74 of the *FCC Rules*.


Marti Electronics RPT-2 2.5W transmitter with the standard chassis-mount antenna attached.




Marti Electronics series RR RPU receiver, shown in the rack-mount configuration.

The unit will accept two audio inputs, a microphone and line-level feed, and each input has its own gain control. The RPT-2 uses a compressor/limiter to prevent overmodulation and to free the operator of gain-riding chores.

The companion receiver to the RPT-2 is Marti's series RR, which can be used in portable or fixed applica-

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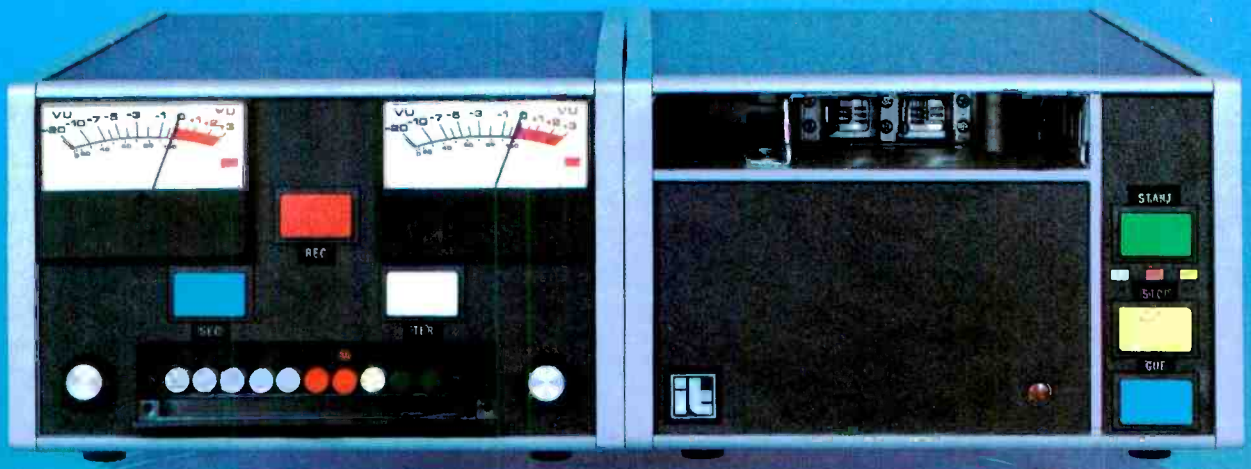


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tions. The series RR units can be powered from the ac line or any external 12Vdc supply. A subaudible tone decoder is included in the design, allowing the RR model to be used as part of an unattended remote relay station. The receiver can be ordered for any frequency of operation to match the RPT-2 transmitter.

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McMartin Industries RPU-1103 3W portable transmitter with a *rubber duck* antenna attached.

**McMartin RPU series.** McMartin Industries manufactures a 3W remote pickup transmitter for use in the 150MHz or 450MHz bands, designated the RPU-1103 (lowband) or RPU-1403 (highband). The unit includes a built-in battery for portable applications. Dual-frequency operation is available through the addition of a second plug-in channel element. The two operating frequencies may be separated by as much as 1MHz in the lowband version and 2MHz in the highband unit. Two audio inputs are provided—one microphone and one line-level—and are individually adjustable. A built-in compressor provides up to 25dB gain control.

McMartin's remote pickup unit receiver is the RPU-1150R for lowband operation or the RPU-1450R for highband systems. The receiver is ac-powered and designed for rack mounting. Dual-channel operation is possible within 1MHz, and remote channel switching is included in the design, making it possible to place the receiver as close to the antenna as practical for optimum performance. A carrier-operated relay provides a contact closure to indicate the presence of a signal.

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Moseley Associates RPL series 10W transmitter, featuring a 3-input audio mixer and front-panel metering.

**Moseley RPL.** Moseley Associates offers RENG users a heavy-duty 10W portable transmitter that can be operated on any one, or optionally two, of the 150MHz or 450MHz RPU channels. The RPL series unit includes no internal battery, but may be powered by any external 12Vdc source or 120Vac. An audio mixer consisting of two dedicated microphone channels and one line-level channel is included in the transmitter, along with a newly designed peak audio limiter to prevent overmodulation. The gain control circuit can compensate for more than 25dB variation in signal level and still keep audio distortion to a minimum. Metering is provided for a number of parameters, including forward and reflected power, IPA drive current and final amplifier current. The transmitter is built using modular construction techniques, allowing easy repair.

The RPL series receiver is an ac-powered unit designed for rack mounting. Switch-selectable dual-frequency operation is available as an option, with as much as 1MHz separation. An optional carrier-operated relay can be supplied for external control functions. The receiver, like the transmitter, is modular for effective shielding and ease of maintenance.

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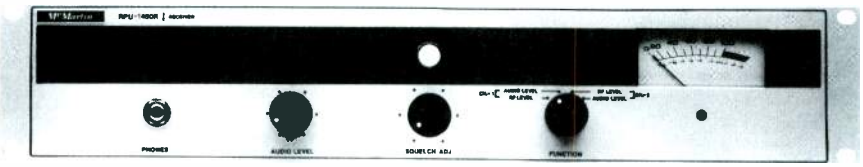


McMartin RPU-1450R dual-channel, crystal-controlled receiver.

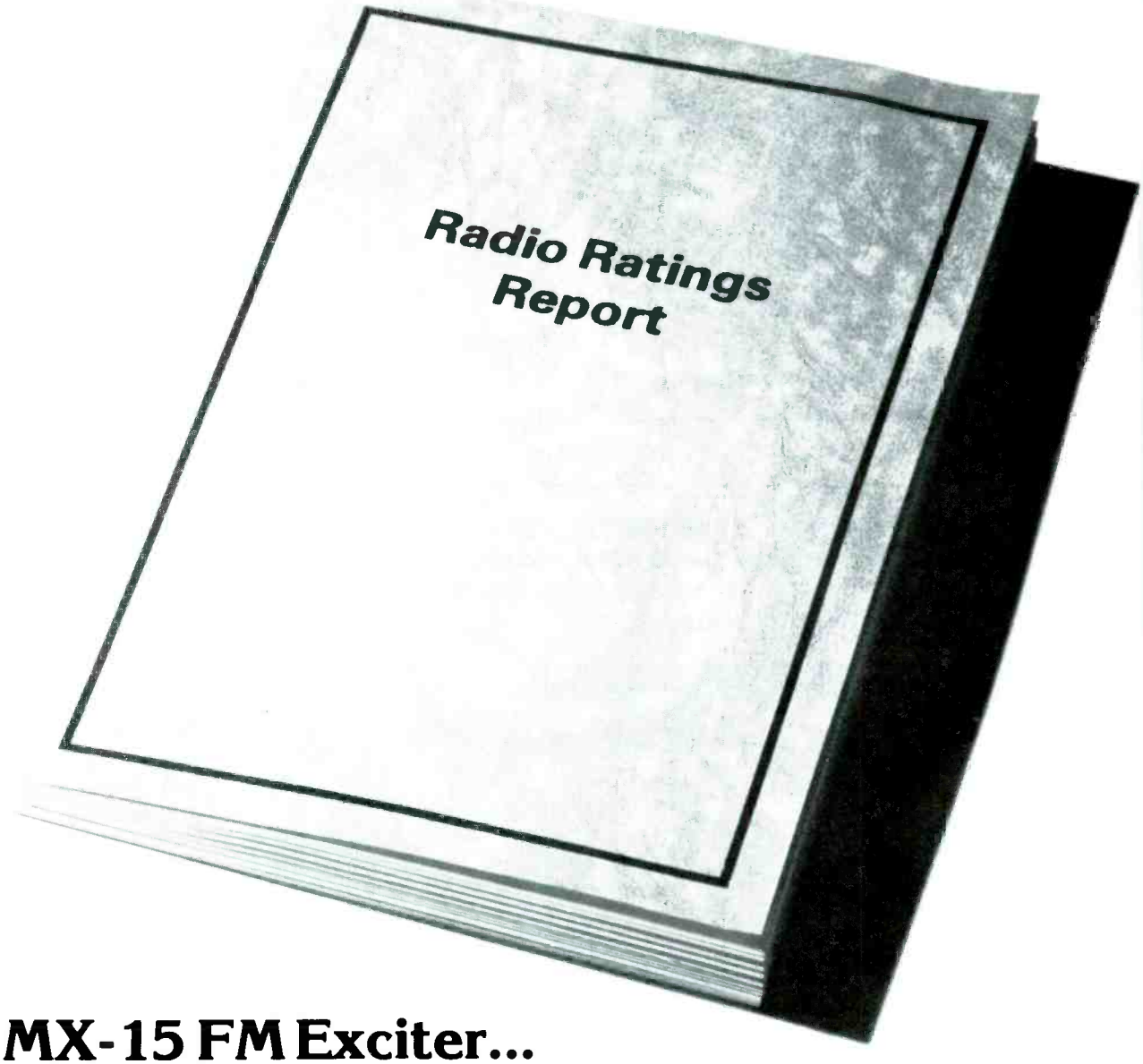

Motorola Electronics MX300 series Handie-Talkie FM 2-way radio featuring frequency-synthesized operation.

Motorola Mitrex transmitter/receiver base station unit. The control head can be mounted externally from this assembly.

**Motorola MX300.** Although not generally thought of as a manufacturer of studio-quality remote pickup gear, Motorola Electronics is known for its extensive line of top-grade industrial communication radios and systems. This equipment can be used for RENG with the drawback of limited audio frequency response. Most communications-grade systems are limited to 300Hz-3kHz response, far less than competing broadcast systems and below the expectations of most RENG users. What this hardware lacks in frequency response, however, it makes up in versatility and reliability. These units can be designed to meet almost any need and are constructed of plug-in modules that allow easy field modification and service.

Typical of the portable Motorola gear available in the RPU bands is the MX300 hand-carried transmitter. With a power output level of 5W, the MX300 includes a full range of user options.

Receiving units for the Motorola systems can take a number of forms. The Mitrex console is typical for broadcast-related use. It provides transmit, receive and system control functions in a base station arrangement.

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Two patented components—unavailable from anyone else at any price—are standard with the MX-15. The Dynamic Transient Response (DTR) Stereo Generator Filter assures maximum safe modulation without overmodulating. And the Harris Automatic Stereo Pilot Phase Control ensures adjustment-free performance over the long haul.

### ▶ Read Up

Study the competitive literature. Not only do we welcome comparison with the BE FX-30 and the Continental 802A—we *encourage* it. For more information, contact Harris Corporation, Broadcast Transmission Division, P.O. Box 4290, Quincy, Illinois 62305-4290. (217) 222-8200.

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Stations wishing to have the options available with these Motorola units (and systems manufactured by other companies) while at the same time enjoying the wide frequency response characteristics of standard broadcast RPU systems can consider having the equipment modified to provide wider audio bandwidth. This type of work is far beyond the scope of most engineering shops, but at least one company* has been successfully modifying Motorola communications gear to provide response out to 7.5kHz or better, while at the same time not exceeding the bandwidth limits of FCC Part 74 rules. Performing any transmitter modifications will affect the equipment's type acceptance, so this work should be done only by experienced technicians.

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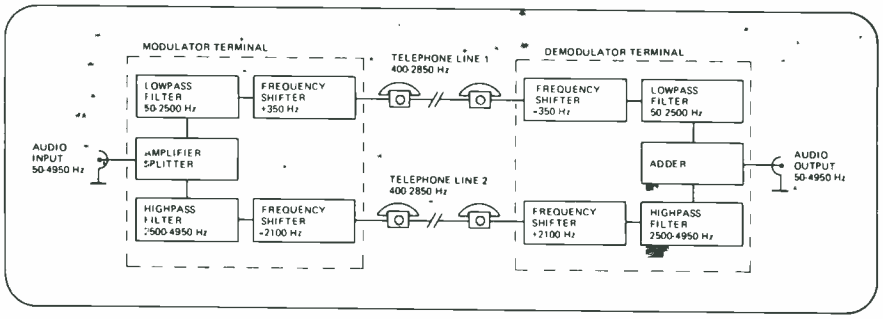
*J-ngineering, 20811 Parthenia, Canoga Park, CA 91306.




Courtesy of C.N. Rood

**Figure 1.** The basic 2-line frequency extension process.



## Wired systems

Wired communications systems for remote news or sports events can take a number of different forms, from basic telephone company equalized loops to sophisticated single- or multiple-line frequency extender systems using the dial-up network. Equalized lines offer the user a simple, reliable link to the studio. Their drawbacks are inflexibility, installation time and rental costs. Using the dial-up network gives the user a greater degree of flexibility than with standard equalized loops, however the level of performance leaves much to be desired. The most popular way around this problem is through the use of a 2-line frequency extender system, as illustrated in Figure 1.

There are a variety of extension methods, each with a different way to accomplish the task. Generally speaking, however, audio from the source is split into two frequency bands by a filtering network. The higher frequency components are shifted lower by a conversion circuit for application to the telephone company dial-up network. The lower frequency components are shifted upward by a second conversion circuit and applied to a second telephone line. At the studio demodulator end, the two signals are frequency shifted back to their original values, filtered and combined to form the output of the systems. Variations on this method include use of single- or multiple-band compressors, variable equalization and compandor circuits.

The following is a representative sampling of frequency extension equipment.

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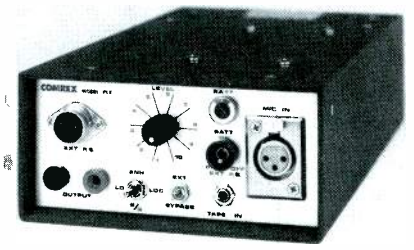

Comrex PLX single-line transmitter unit, which can be powered by an internal battery or external supply.

Comrex RLX single-line receiver/demodulator made for rack mounting.

**Comrex PLX.** Comrex manufactures a variety of telephone company line conditioning equipment, including 1- and 2-line frequency extension transmitters and receivers. Single-line systems can extend the low frequency response of the typical telco link down to 50Hz. The upper cutoff frequency is determined by the network, generally something below 3kHz. The Comrex PLX single-line unit shifts the lower audio frequencies of the source up to within the passband of the telco system. The companion RLX receiver, located at the studio, restores the proper frequency division, resulting in greatly improved low frequency response. The Comrex system also incorporates a 5-band compandor circuit for line noise reduction.

The PLX transmitter unit is compact and easy to transport. Operational controls have been reduced for simple setup and user convenience in the field.

If higher frequency response is required out of a standard dial-up telephone line or dedicated broadcast loop, Comrex offers a 2-line system that will give essentially flat response from 50Hz-5kHz, as well as line noise reduction.

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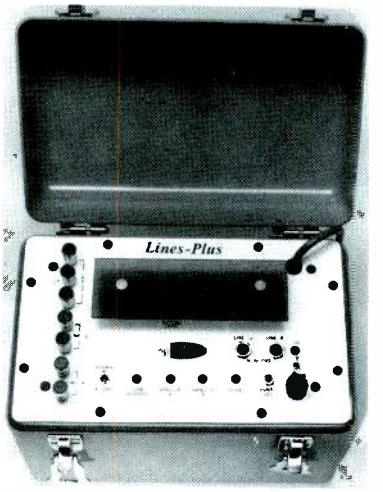


Kahn Communications Lines-Plus transmitter. A companion unit is used at the studio for the decoding process.

**Kahn Lines Plus.** The Lines-Plus system from Kahn Communications is a 2-line signal conditioner that can deliver frequency response from 50Hz-5kHz over the standard switched telephone network. One line carries the signal components of the source audio below 2.5kHz and the other carries source components above 2.5kHz through frequency translation circuits. The Lines-Plus system incorporates a compandor system to reduce line noise and a patented protection circuit to guard against the possibility of an accidental disconnect from the telco network caused by in-band program material.

The transmitter unit is packaged in a rugged portable case. Setup in the field is straightforward. Slow speed 2-way signaling using frequency shift keying is included in the system design for cueing purposes.

The companion receiver/demodulator restores the source audio within tight limits. The specified frequency response with good quality dial-up lines is within 2dB from 50Hz-5kHz, with an approximate 200Hz gap at 2.5kHz. Distortion is typically less than 2% and the frequency translation error introduced by the system is within 1Hz, according to the manufacturer.

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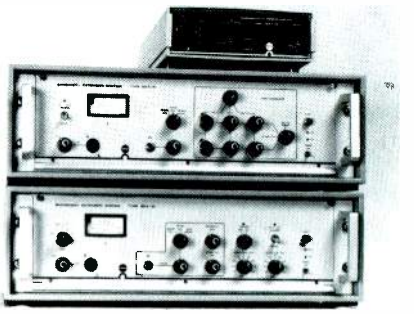

C.N. Rood BAX bandwidth extension system. The small unit at the top of the photo is a portable single-line transmitter. Below it are the 2-channel demodulator (top) and 2-channel modulator (bottom).

**Rood Bax.** The C.N. Rood BAX Bandwidth Extension product line includes 1- and 2-line systems that can deliver response from 50Hz-2.5kHz and 50Hz-5kHz, respectively. Transmission frequency shifting is used to implement the extension process. The receiver/decoder includes the necessary circuitry to restore normal program audio, within the limits of the chosen system. An adjustable equalizer in the studio unit allows optimization of individual telephone company lines. A compandor circuit improves the system S/N ratio and masks telco line noise.

Peak-reading program meters on the transmitter and receiver make observation of signal levels easy. Headphone outputs also are included on each unit. Controls on the transmitter are kept to a minimum for easy setup in the field.

An interesting application of a single-line encoder/decoder such as the Rood BAX system is shown in Figure 2. Audio from a news or sports story is recorded at high speed on a 2-speed tape recorder. When the material is fed to the station, the low speed is used and the recorder output is fed through a single-line bandwidth extension system. At the studio end, the feed is recorded on the low speed of another 2-speed machine. When the feed is played back on high speed at the studio, an effective doubling of frequency response at the high end is achieved. With this arrangement, it is possible to squeeze a signal bandwidth of 100Hz-5kHz through a single dial-up telco line.

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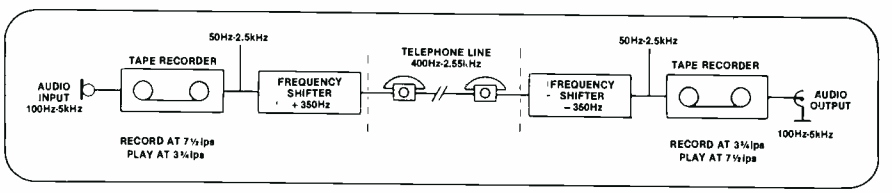


**Figure 2.** A frequency doubling technique using 2-speed tape recorders.

## Final notes

As you can see, the options available to a station wishing to improve its remote broadcast capabilities are numerous. For a complete listing of manufacturers supplying RENG equipment, consult the **Broadcast Engineering** *Buyers' Guide* in the September 1983 issue.

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# A snap-together production system

By Raymond J. Smith, director, technical operations, WKYC-TV, Cleveland, OH

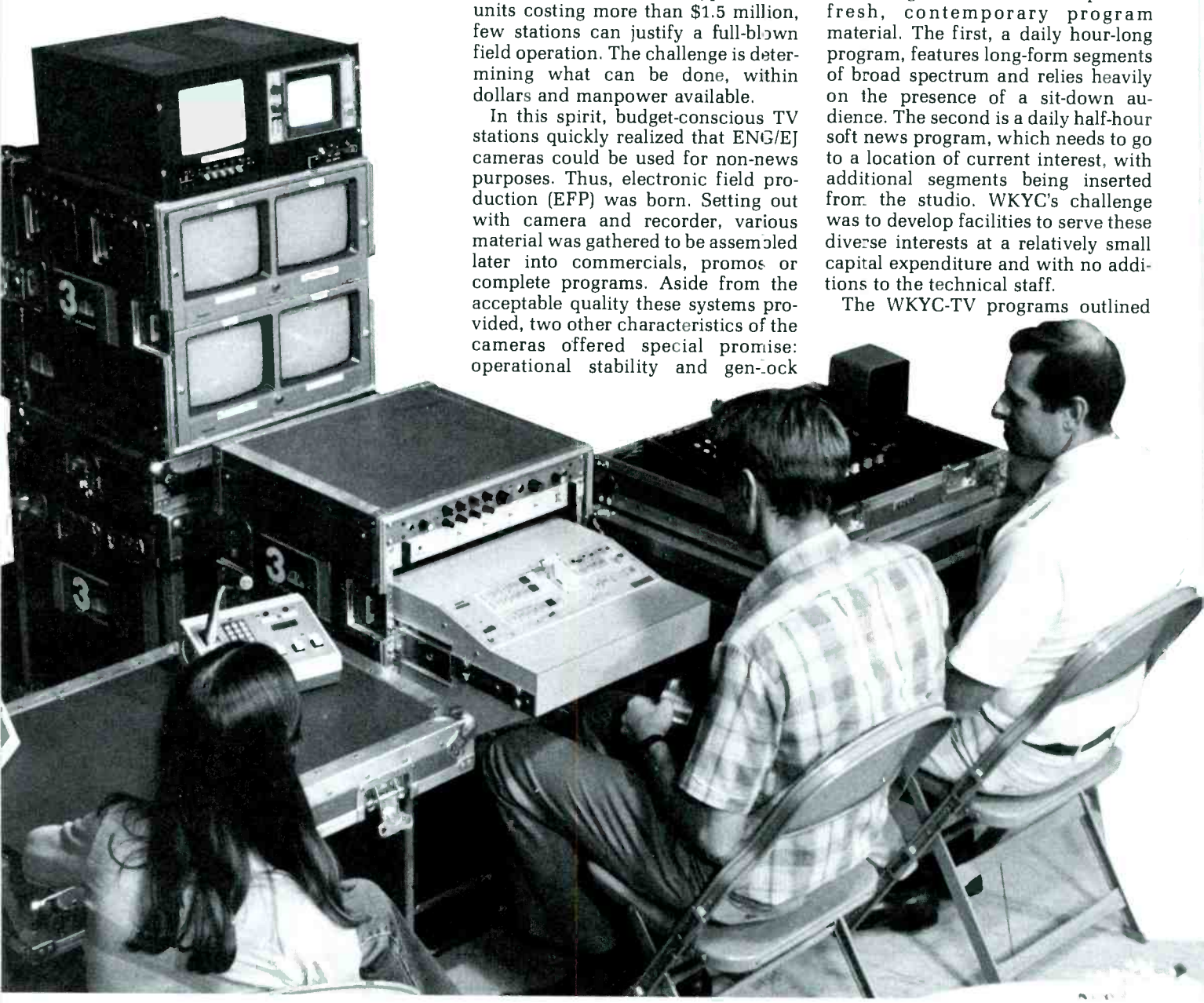
The urge to break the 4-wall constraints of the TV studio has been with us since the TV medium began. In an era when news and sports coverage has caused us to expect on-the-spot coverage of events, the need for mobility and freedom is greater than ever. Cost often is prohibitive, however, which is why WKYC-TV's production system has evolved. In actual station operations in which creativity is expected, communications school graduates want more and better tools. However, with network-type mobile units costing more than $1.5 million, few stations can justify a full-blown field operation. The challenge is determining what can be done, within dollars and manpower available.

In this spirit, budget-conscious TV stations quickly realized that ENG/EJ cameras could be used for non-news purposes. Thus, electronic field production (EFP) was born. Setting out with camera and recorder, various material was gathered to be assembled later into commercials, promos or complete programs. Aside from the acceptable quality these systems provided, two other characteristics of the cameras offered special promise: operational stability and gen-lock features. Gen-lock allowed the simple, multiple-camera pickup to become a reality.

### Video switching

WKYC-TV has two programs that need to go on the road to provide fresh, contemporary program material. The first, a daily hour-long program, features long-form segments of broad spectrum and relies heavily on the presence of a sit-down audience. The second is a daily half-hour soft news program, which needs to go to a location of current interest, with additional segments being inserted from the studio. WKYC's challenge was to develop facilities to serve these diverse interests at a relatively small capital expenditure and with no additions to the technical staff.

The WKYC-TV programs outlined



Ready for the action to begin, the complete snap-together control room requires approximately an 8'x10' area.

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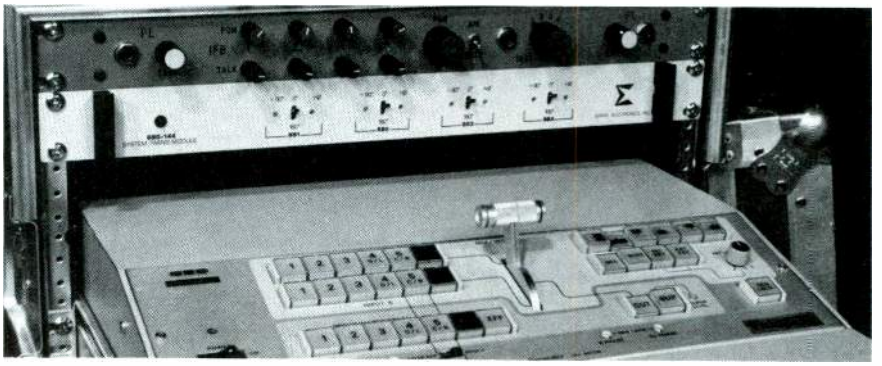
previously do not require elaborate switching and effects systems. The focus is on the content of the discussion, demonstration or report. This would be the case for many other formats, for instance a play or musical presentation. To televise such programming, a relatively simple video switcher must have sufficient video inputs, dissolve/super capability, simple effects, key/insert and tally light circuitry. For this part of the project, we selected the Panasonic 4600 switcher/effects system. It has the capabilities we sought, and it is close to being a transparent device in terms of signal handling.

The desirable characteristics of the newer minicams—long-term stability, auto gain controls and gen-lock—allow cameras to be connected directly to a switcher, without having to go through the traditional video control position. Cameras used with the switcher are synchronized with a blackburst system timing module sold by Sigma Electronics. The 4-channel device takes sync and subcarrier from the reference sync generator in the switcher and distributes the signals necessary to gen-lock the cameras. Using one camera through the switcher as a reference, the other camera signals are fed through the switcher to a video amplifier in a phase comparator mode. The output of the amplifier is viewed on a scope. Pulse delay and subcarrier phase for the channel feeding the camera to be matched are easily adjusted for cancellation of errors. The adjustments are more than adequate, compensating 360° of phase and 2000 feet of cable.



The Panasonic WJ-4600B is slide-mounted in one of the transport cases, with easy access to Sigma Electronics phasing equipment and the communications system level controls.

### Cameras

The cameras used with the system essentially are unmodified Ikegami HL-79s taken out of regular news service. Assuming they have been properly set up on the maintenance test stand, they need only to be reconfigured to approximate a traditional studio/field camera. To do this, a small black-and-white monitor is attached as a viewfinder, and remote controls are connected to the zoom lens to allow operation using typical pan handles. The camera mounting plates have been redrilled and tapped to allow the camera to be positioned forward to better balance the weight of the viewfinder. The only modifica-

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tion was the addition of a small jack that simultaneously provides party line (PL) or interrupted feedback (IFB) for use by camera operators or talent.

### Audio

Audio mixing is handled by a unit from the RAMSA division of Panasonic. Each of eight inputs has a selectable input level. Separate pots control high/low equalization, pre-/post-mix and pan. The pre-mix position is used for audition.

The console is a dual-channel system, with the second channel used to feed a PA system for programs having audiences. Although not exactly signal-transparent, the console is more than adequate for remote pickups. Chosen primarily for its size, it has a remarkable amount of facilities in a space the size of an attaché case. Audio from microphones usually is brought into the control area to the mixer on a 9-pair cable.

### Communications

The Ikegami cameras contain an excellent interphone system. A decision was made to expand the system backward toward the control area, instead of extending the system built into the video switcher outward toward the cameras. Bridging amplifiers were provided for the TD and director. Also, this common bus can be extended to associate directors, who are tied into the system through the microphone circuit in the camera cable and terminated in a mic connector on the camera head. If this is inconvenient, separate cables are run from the IFB system, which provides direct communications to four talent positions from a microphone at the director's position. The IFB operates on an individual or all-talk basis.

Using a telephone dial in the control box, a coordinating telephone call can be established with the studio and the director can talk to the studio using the microphone provided for IFB. Off-air audio is available on the system from a TV demodulator or on a patchable basis, such as a direct feed from the audio console. Program and talk levels are individually adjustable.

### Packaging

As indicated previously, one of the goals was to create a remote pickup facility that would be manpower efficient. That is partly achieved through the use of ENG cameras that require no video operator, can be installed easily and can be handled by one person. The remainder of the goal is accomplished through the use of relatively small components and through the method of packaging.

Serious consideration was given to the types of locations that might serve as control areas. The equipment should be usable almost anywhere, in an 8'x10' area. Because the area could be in an auditorium, a shopping mall, below deck of a tour boat, on a roof or in a truck, the equipment must be highly portable, but also well-protected. Heavy-duty cases by Anvil and the types of cases used to ship cameras were selected for both reasons.

The equipment, when assembled to travel, occupies about 75 cubic feet of space and can be taken anywhere with little effort. Typically, the equipment list includes the following:

- a camera shipping case, with casters, for viewfinders, pan handles and miscellaneous attachments;
- a portable case with four camera monitors permanently mounted;
- a case, with casters, containing slide-out video switcher, pulse/phasing distribution device, off-air demod and IFB distribution system (An empty space at the bottom is used for the live monitor and test equipment during transport.);
- a similar case, also on casters, with drawers for headsets, mic cables, IFB control station, microphones and miscellaneous items;
- a portable case containing the audio console and monitor speakers;
- a shipping case carrying miscellaneous cables and adapters;
- four cable reels to handle 350 feet of cable for each camera, and one reel with the multipair audio cable;
- camera power supplies, batteries, tripods and pan heads;
- two folding plywood table bases, with the covers of the largest case, providing table surfaces for the audio operator and director; and
- a 4-speaker PA system packaged in a suitcase.

The decision not to permanently install the equipment in a vehicle was deliberate. Total portability unfetters the thinking of potential users. They dare to think they can do an acceptable telecast from almost anywhere.

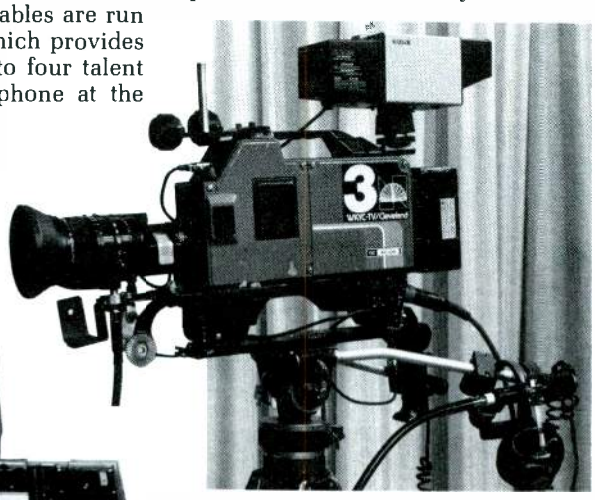
A special vehicle is being considered for WKYC-TV. Rather than a dedicated mobile unit, we are planning a vehicle that can provide the space necessary to serve as a control room, as well as other uses. It will be a chopped van with a box-type body mounted on the chassis, similar to the aluminum boxes seen frequently on small rental moving trucks, with swinging doors on the rear and a right side entry near the front.

Human considerations will be minimal, consisting of insulation, carpet, wall covering and simple heating and cooling. In fact, seating probably will be a fold-down bench seat or folding chairs. Minimizing the built-in custom features allows the vehicle to be used for other purposes. It will be the carry-all that will take equipment to locations.

Another use of the truck will be as a microwave relay unit to send signals back live, when we have a line-of-sight path. It will carry a 27-foot mast and will store the spare microwave transmitter when not needed for EJ operation. This will allow live pickups for the program department without having to take a live news vehicle out of service. It goes without saying that the vehicle could easily be pressed into live news service.

*Continued on page 68*

A RAMSA audio mixer and assorted audio hardware fit easily into two small cases.



An Ikegami HL-79D in EFP configuration includes a small Sony monitor mounted to serve as a viewfinder. Pan-handle-mounted lens control also is shown.

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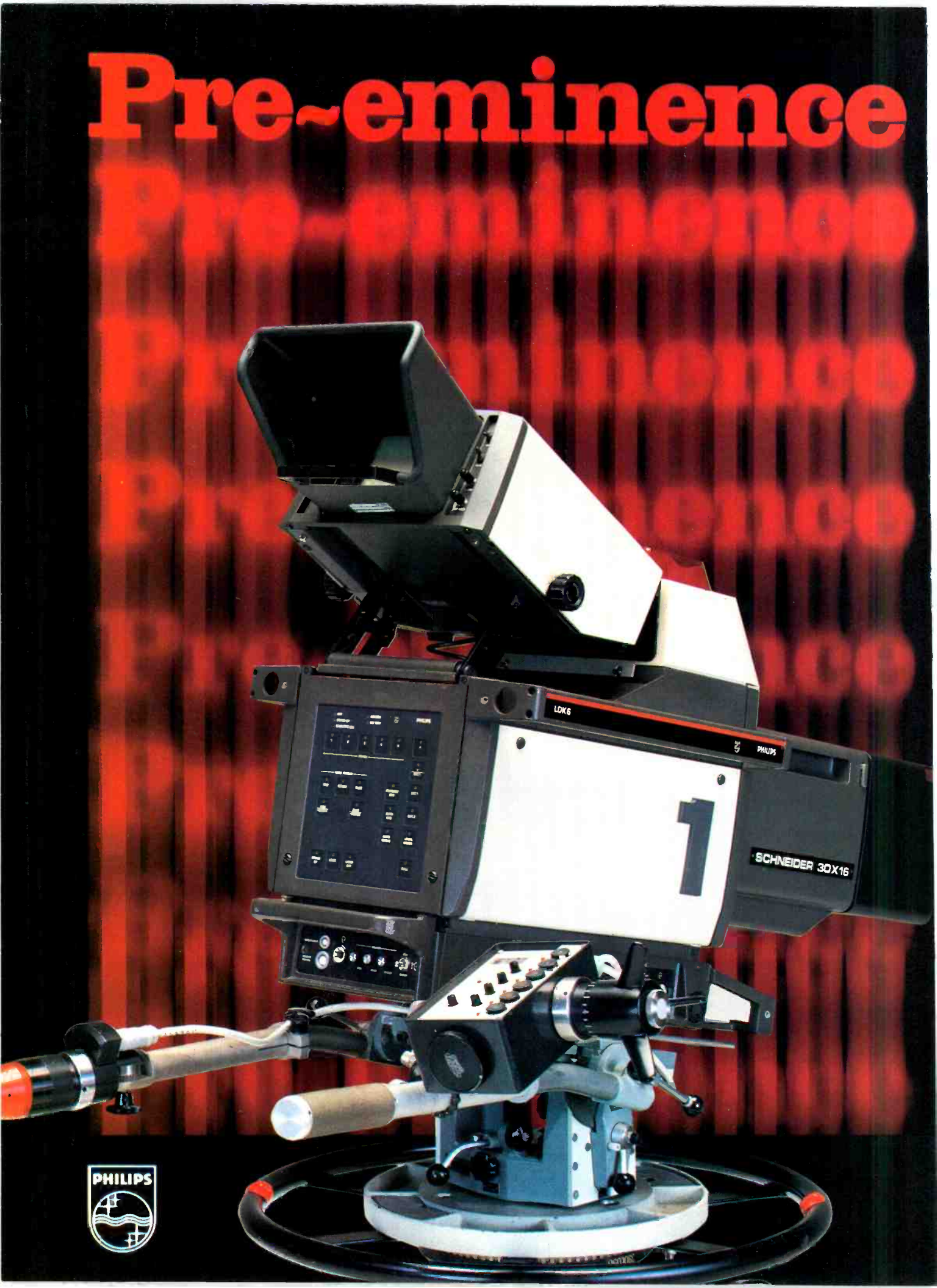


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With the brilliant picture quality assured by optimized digital scan correction. With the distributed intelligence of four microprocessors. With production memories of your day-to-day set-ups giving unrivalled operational flexibility and creative freedom. With triax reliability and economy. With multi-level diagnostics. And with minimum cost of ownership.

**Reader enquiry no. 100**


## ...and the perfect portable partner

The LDK614 is the perfect portable partner. This rugged yet lightweight triax or multi-core RGB camera is equally at home in the studio or mobile unit. It operates independently or via the standard LDK6 control units for compatible colorimetry, performance and versatility.

**Reader enquiry no. 101**

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## Monitors of quality & economy

High stability, quality, reliability – at a very reasonable price. These are the reasons for the international success of the Philips LDH6200 14" color monitors.

These rugged yet stylish monitors have a high specification and many operational features only found on more expensive units. And monitor to monitor matching is excellent.

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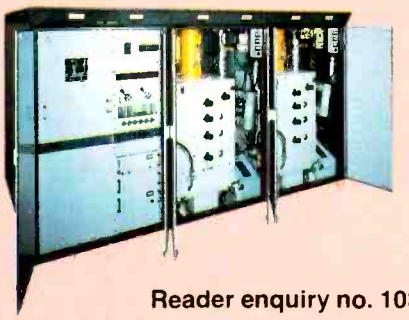
## Transmitters a story of success

Pye TVT is famous for its UHF television transmitters. Thousands in many countries of the world perform to perfection every hour of every day of the week. State-of-the-art development – such as cost-saving beam control klystrons – ensures that the family covers the requirements for reliable and efficient medium and high power transmission.



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| ☐ UHF Television transmitters | 103 |
| ☐ Television systems | 104 |

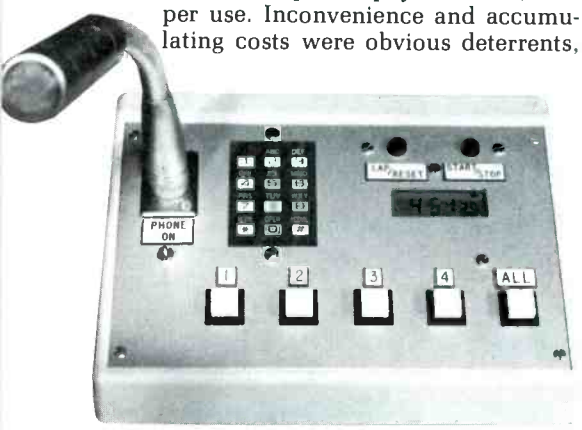
Name
Organisation
Address

BE 1 1 84

*Continued from page 64*

### System uses

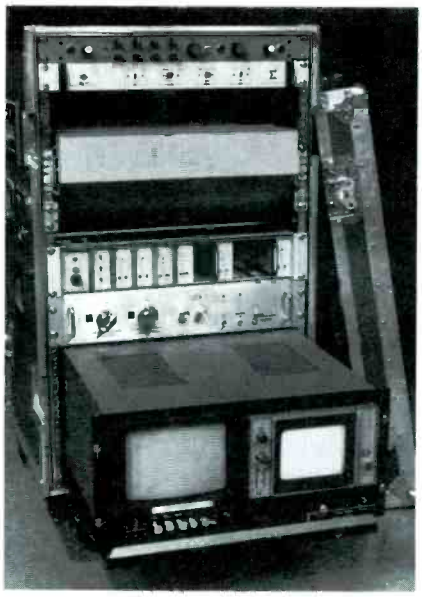
Previously, if the program or news departments wanted to do anything more than a single camera pickup, fed back to the studio via microwave, we had to pre-arrange the rental of a traditional mobile unit. If luck was with us, and a local unit was available, we could expect to pay $4000 to $5000 per use. Inconvenience and accumulating costs were obvious deterrents,




The director's communications set includes a timer, microphone and IFB selections. The phone pad may be used with a telephone pair to communicate with the studio.

as were the limitations—parking space and a circuitous string of camera cables—of that type of unit. Field stripping traditional mobile units for inside installation of the control equipment also was out of the question.

The negatives have been overcome since the equipment described previously was placed on-line. For instance, a recent hour-long program was televised in the public area of an indoor shopping mall. The environment provided an exciting staging area and regular business activities provided a 1000-person audience. The



IFB/PL circuitry, video patching and camera inputs easily fit into a single case.

Also in the video switcher rack are distribution equipment and an off-air demod. Line monitoring equipment pulls out for use atop the camera monitor case.

control area was located in an adjacent vacant shop.

Another typical use of the equipment would be for the pre-taping of a play in an intimate theater. The small size of the cameras makes them less of a distraction. One or two cameras may be used in the hand-held mode, which allows needed mobility. For a play, as was done last year, the show was shot as though going live and mixed through the switcher with the output fed to a recorder. Simultaneously, the hand-held cameras were fed to individual recorders. All of the tapes were later re-edited at the studio into a better package than could have been achieved on location. The time-saving advantage of using the video switcher as a pre-editing device is obvious. As soon as it becomes available, an Ampex/Nagra portable 1-inch recorder will be added to the total equipment package.

An example of an unusual application of the system was an hour-long program taped on a cruise boat on Lake Erie. The control area for that production was a lounge area below deck.

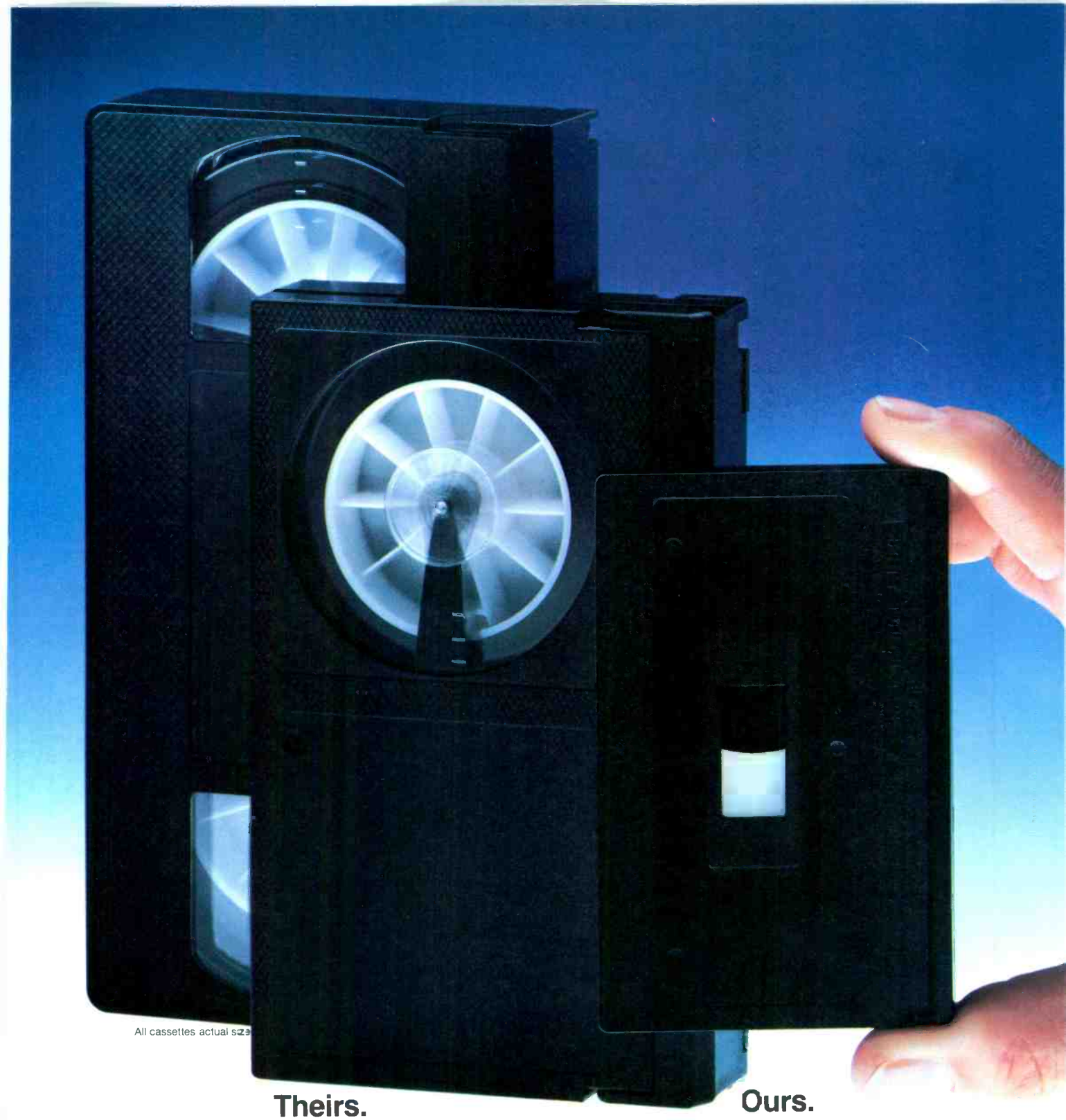
Plans include a program to be done at the Cleveland Zoo. In an area inaccessible to a traditional mobile unit, the equipment will be set up using an amphitheater as the staging area. The animals will be brought to television, instead of the reverse process of setting up and tearing down equipment, exhibit by exhibit. Consider the time savings and control of subjects.

The list of system applications is growing rapidly with fresh ideas still forming in the minds of the program, news and commercial sales people.

### Final notes

The problem we faced was how to take the program and news department activities on the road without facing the handicaps of remote broadcasting using traditional TV mobile units. Having decided that some compromises could be made to still turn out a respectable product, a packaging scheme was developed that had utility, not aesthetics, as its goal. Components were chosen that permitted straightforward, high density systems engineering. The concentration has been on implementing good ideas, not demonstrating spectacular engineering. The result has been a broadcast tool that considerably enhances the ability of WKYC-TV to participate in the trend toward more local television.

Most equipment needed for an on-location production is contained in this group.



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You can fit a Quartercam cassette in your shirt pocket. You can't with VHS or Beta. You can save a lot of archive space and shipping costs.

The logical ENG/EFP successor to ¾-inch is ¼-inch—not ½-inch. If you're going ½-inch you're only going half-way.

Call your local Bosch-Fernseh office, or Fernseh Inc., P.O. Box 31816, Salt Lake City, UT 84131, (801) 972-3000.


**BOSCH**

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# KPRC-TV: At the eye of the storm

By Ed Schafer, ENG engineering supervisor, KPRC-TV 2, Houston, TX

Residents and media along the coast of the Gulf of Mexico know the potential danger of a hurricane. The media watches any tropical disturbance closely and tracks its path so that news departments, with the aid of engineering, can cover the hurricane. No matter how complete the preparation, however, there always will be surprises.

From years of experience in news coverage of hurricanes in the Houston area, KPRC-TV has developed good engineering practices to meet the needs of the news department.

KPRC-TV has three live microwave-equipped Chevrolet Suburban vehicles. Each unit features not only a microwave transmitter, but also is fully equipped with Sony BVU-200 machines and a BVE-500 editor for field use. The necessary switching equipment, audio mixers, color bar generator, IFB equipment, audio and video monitors and 2-way radio make each unit a mobile studio. The units are used constantly and maintained to be capable of moving on a moment's notice, as the need arises. An engineer, assigned to each unit, is fully aware of the total operation of the equipment contained.

When the expected path of the hurricane approaches and an estimated timetable can be set up, arrangements are made to feed from key points along the full Texas Gulf Coast. These feed points, beyond the live units' microwave range, usually are made through Western Union facilities. Crews are dispatched to these points in advance, to be on location when the hurricane arrives. Arrangements are made with stations in those areas to feed videotape, when possible, or the crew may carry a feedpack equipped to feed directly into Western Union's terminal.

Because there is always a potential for losing incoming electrical power, KPRC-TV has an emergency generator with automatic switching at the studio and transmitter sites. The generator at the studio supplies power to the radio and TV studios. To avoid creating an overload with the full TV control room equipment, a smaller power generator is set up to supply power to an ENG camera and lights, along with an audio mixer, to be capable of maintaining a continued feed if needed. An auxiliary switcher is set up in the master control room with inputs from a videocassette machine, ENG camera and microwave repeaters, which receive power from the regular emergency power generator.

KPRC-TV engineering personnel are alerted for schedule changes to meet the needs of extended air time. Plans are made to be sure all studio equipment will be functional for the expected extended air time.

These plans were put into effect on Aug. 16, 1983, when hurricane Alicia began to pose a threat to the upper Gulf Coast. Tracking was done through weather bureau information, satellite pictures, weather radar called up along the coast from Florida to Mexico, and our radar when the hurricane came within its range.

KPRC-TV was well-prepared when it became obvious that its immediate area was the site of the impending landfall. A live unit was sent to Galveston, TX, and began feeding reports from locations along the sea wall on the Gulf. As wind velocity increased, this unit moved to the Galveston post office building, which housed the weather bureau. Editing facilities were set up along with a microwave link to KPRC-TV's Houston repeater. The other live units were dispatched to other coastal areas within the range of our two repeaters.

On Aug. 18, when hurricane Alicia moved inland, the planning began to pay off. At no time did our station lose any of its microwave signals. We were able to go live from protected areas and from the Galveston weather bureau. KPRC-TV continued full coverage with only minor electrical power kicks. So successful was the operation of our remote location in Galveston, along with our own news feeds, that NBC and CBS asked for feeds from there also. At our studio, we had sufficient editing facilities to allow other stations to edit packages for outgoing transmissions not only into Texas, but also as far away as the BBC (United Kingdom).

As expected, there were problems. All were minor, with one exception. The live unit in Galveston was parked on the sheltered side of the post office building. In spite of this, five windows were lost as a result of the wind pressure. All equipment in the vehicle, except the microwave equipment, was a total loss because of damage from high-salt-content water. The loss amounted to approximately $70,000, but no staff members were injured.

After any disaster is over, an interdepartmental meeting is held to see what problems arose and what steps might eliminate them in the future. Suggestions are made along with discussions to further improve future coverage. With plans such as these, KPRC-TV remains ready to move at a moment's notice to cover hurricanes or natural disasters, even in the eye of the storm.

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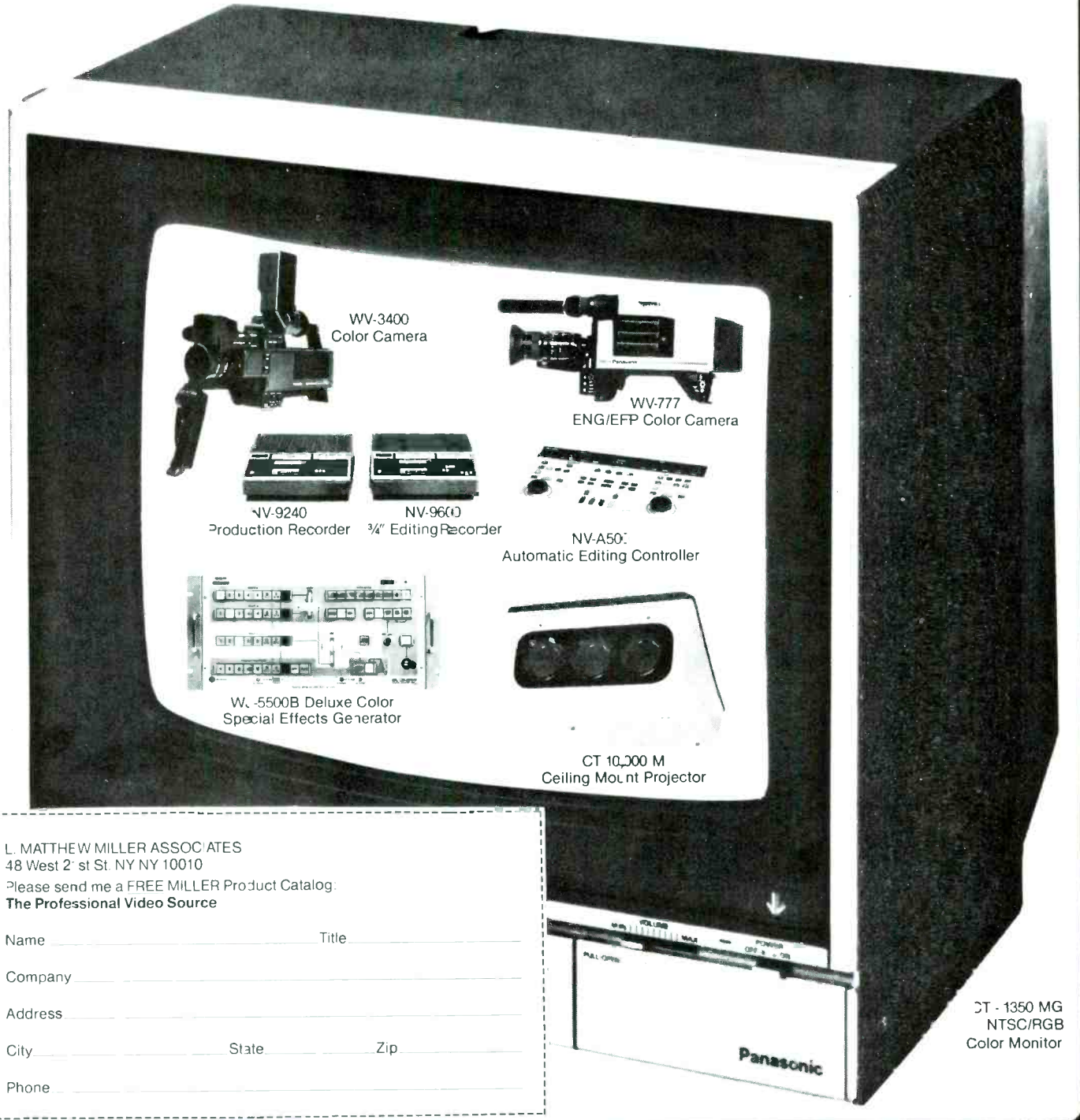


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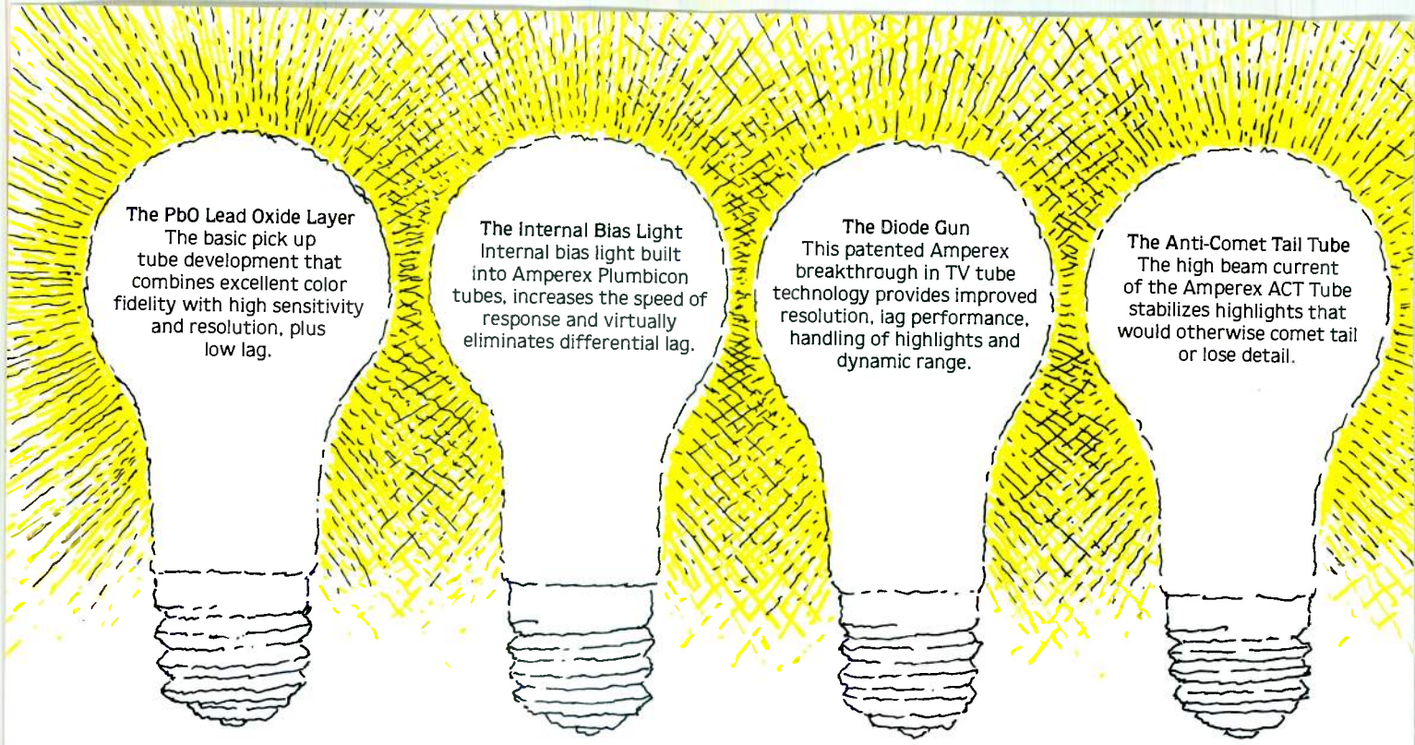
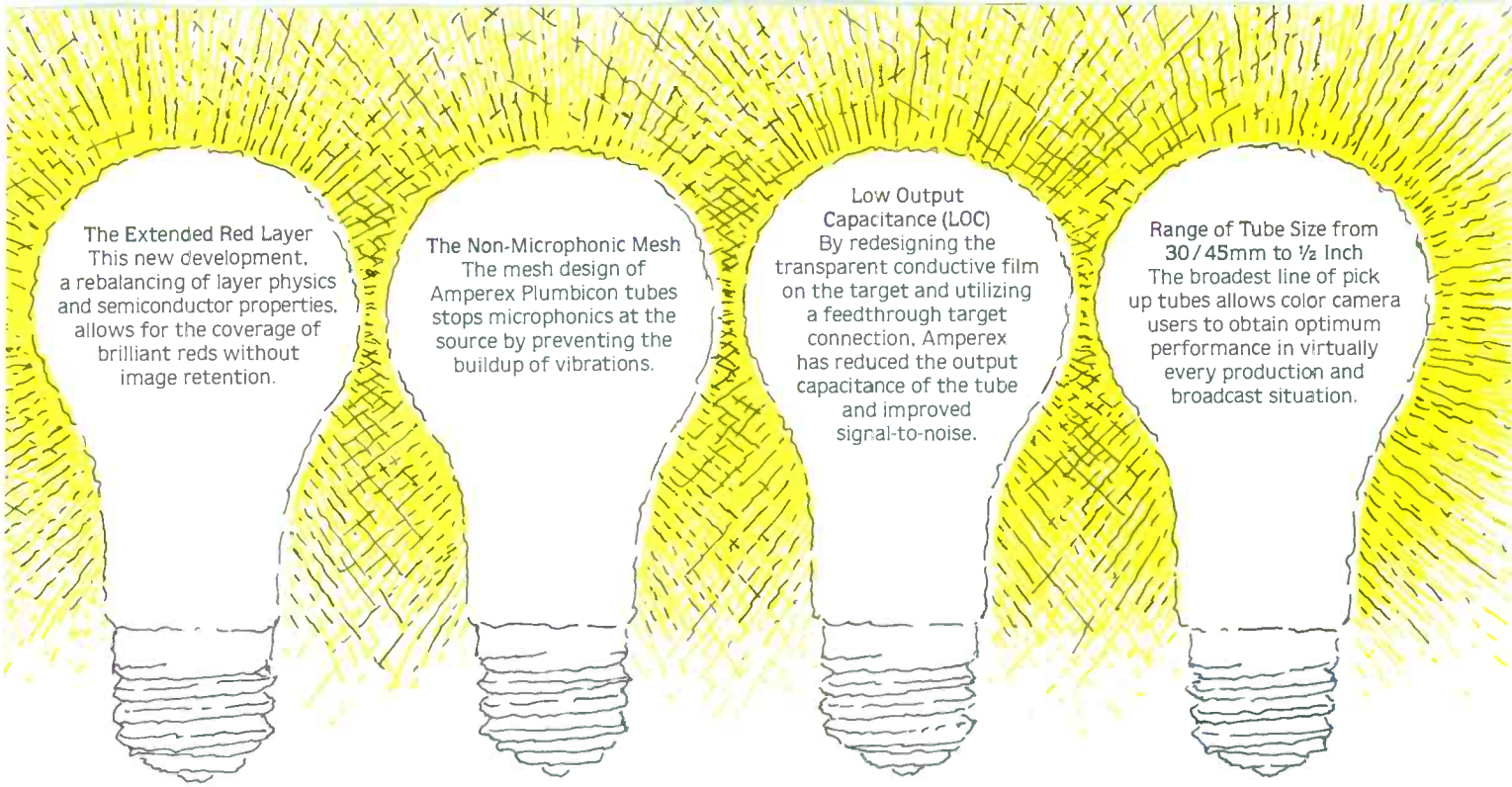



# Eight brilliant ideas in TV

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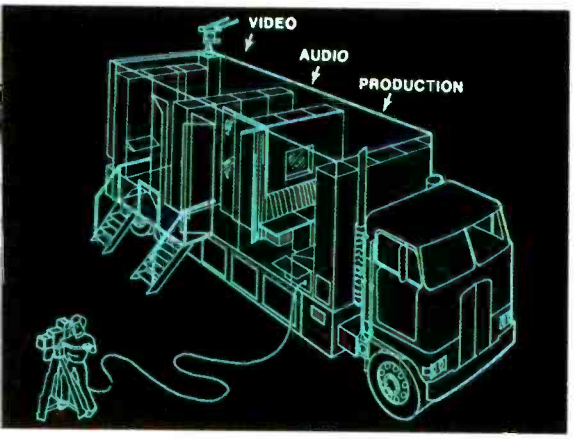
# When CBS Washington needed a new mobile van...




A 3-D rendering shows the three areas of the mobile production facility.


CBS Washington Mobile Unit #10, designed by AF Associates.

•Various customer needs had to be considered in the planning stages of selecting a mobile unit design for the CBS Washington operation. Although it is a part of the CBS Broadcast Group Operations and Engineering Division, CBS Washington has a primary responsibility to serve CBS News. Often, however, the Washington-based group also must provide services for the Sports and Entertainment Divisions.

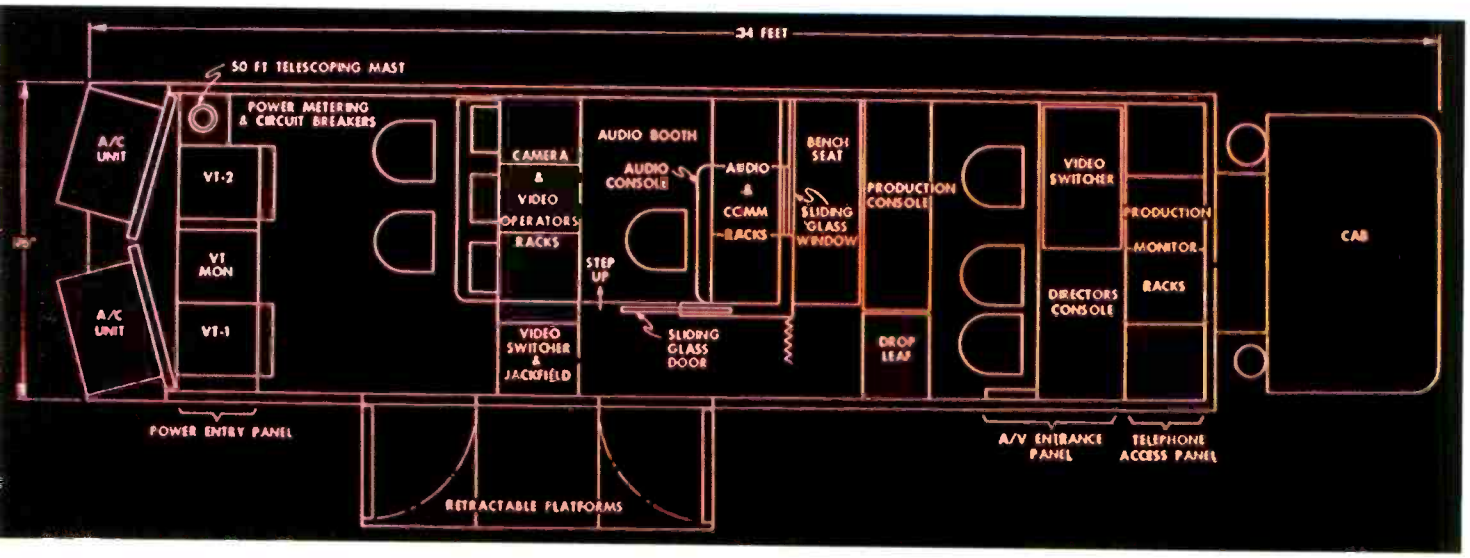
Dwarfed by the Capitol, Mobile Unit #10 is in place to televise the president's address to a joint session of Congress.

Not only did the van design have to meet the news application, but also it had to serve a multitude of requirements, addressing a perceived size and capability level. It also had to provide a quality equal to or better than that normally associated with the larger mobile vans presently in use.

•There was no prerequisite that the unit would be used for daily ENG assignments, but among the assignments identified would be presidential press conferences, area sports, emergency coverage and Washington, DC, activities. To handle such assignments, however, limitations were needed. A large semitrailer-type system is not allowed at the White House or on Capitol Hill, or, in general, on Washington, DC, streets during peak traffic periods.

•As opposed to the usual CBS van design with an "A" van for the main operating vehicle and a "B" van for storage and hauling, this unit would be as self-contained as possible. A single vehicle would be used to

**Editor's note:**
Mobile vans are crucial to most ENG/EFP operations and all are custom-built to meet customers' needs. To round out our coverage, we have taken a look at design considerations behind CBS Washington's Mobile Unit #10. A formal paper describing this van was presented at the SMPTE-'83/Los Angeles Conference by Hy Badler, vice president, production facilities and engineering, CBS Television Network, Washington, DC. The van description presented here is prepared with permission from Badler's notes and slide collection.




An overall floor plan shows the production, audio and video areas, and the breakdown of each area by function.

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Two 1-inch VTRs have slow-motion controls, individual input selectors, both audio channels routed through the audio routing switcher and all the necessary monitoring items.

To the right of the Neve audio mixer is the 25x25 routing switcher, which simplifies audio interconnection into, out of and throughout the vehicle.

simplify and shorten setup times and to reduce parking problems.

•Mobile Unit #10 was designed around hand-held cameras. Previous experience in covering presidential press conferences, State-of-the-Union addresses and interviews with prominent figures showed that ENG cameras offered good quality. Also, they could be used in studio or field production, were backed by a large family of optics, required far less operational equipment or storage space and provided needed flexibility.

# Simply Stated, COMTECH Performs. Here's Why—

**Maximum Gain/Antenna Size Ratio.**
Comtech Antennas consistantly out-perform other antennas of similar size. You get more efficient reflective energy concentrated in a smaller area.

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A Comtech Antenna is designed to stay interference free with optimized sidelobe performance and a superior carrier to interference (C/I) ratio. Sidelobe performance is critical in view of reduced satellite spacing. Comtech Antennas are ahead of time in this area.

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3.0 and 3.8 Meter

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5.0 Meter

7.3 Meter

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# COMTECH Antenna Corporation

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The production area of the truck contains 26 monitors, video switching and positions for the director and producer.

In addition to cartridge audio, a TASCAM 133 cassette recorder/player is available in the audio area.



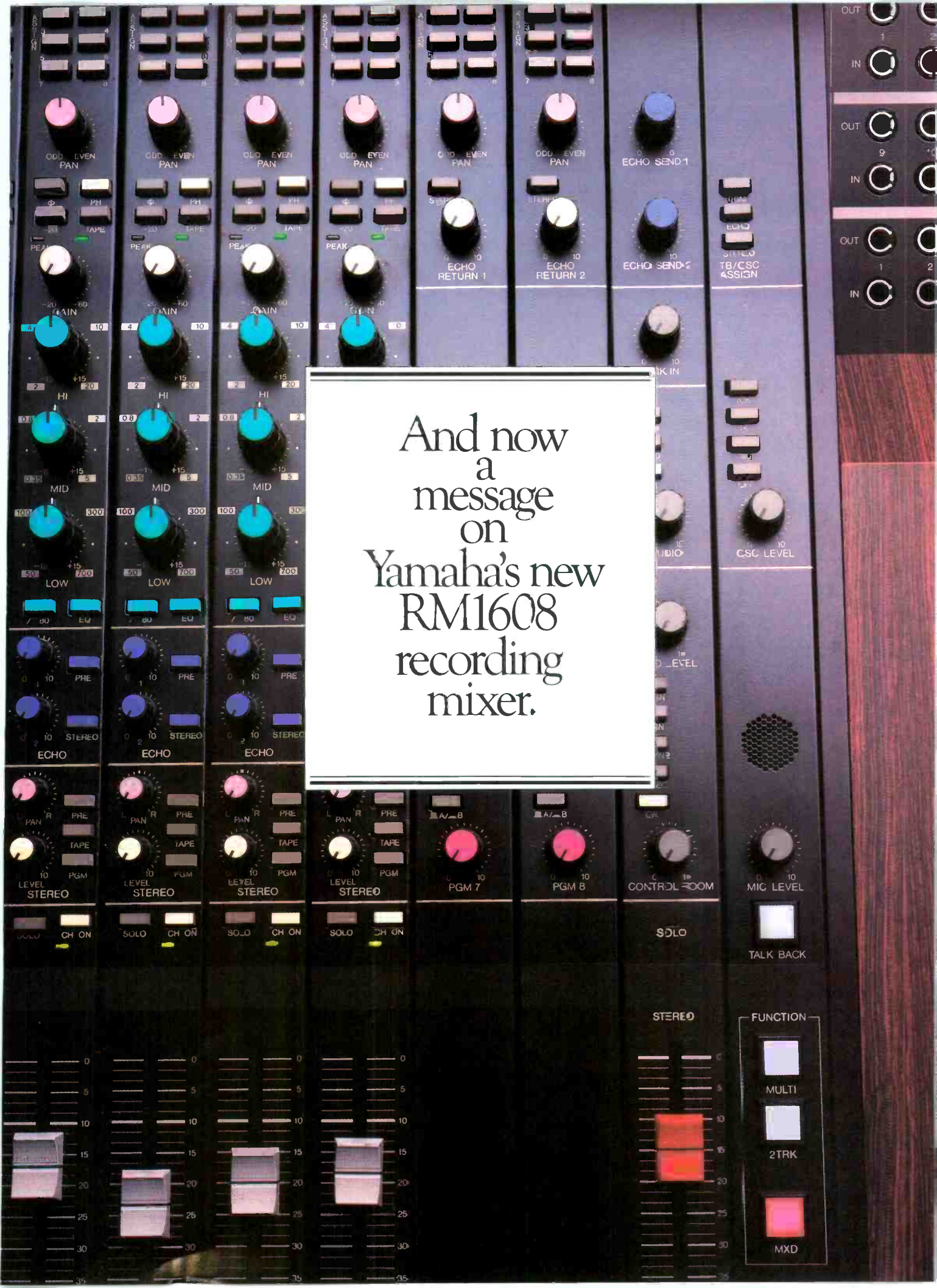
To satisfy some requirements of the ENG camera in a long-lens, tripod-mounted application, CBS developed its own quick-release camera-to-lens mount and a tripod mount that simulated the mass of the larger camera.

•The final product was a self-contained, versatile, 34-foot vehicle containing three main areas for production, audio and video. In the front, the production area for the director, video switcher and associate director also allows space for the producers and their associates. To monitor the production activity, each of 26 monitors have video and tally terminations on a jackfield to simplify individual situation needs.

•Communications were considered heavily. The intercom, interphone, program interrupt/IFB and telephone system had to provide selectable service to any instrument, for MB and PL operation. The intercom provides 12 stations at each position of the truck, with the capability to have 10 remote locations tied together. Two-wire and 4-wire interphone capability required a variety of adapter boxes to mix the various interphone systems found in a complex production situation. The telephone system assigns any input to any position on any of the 10-button telephone sets. Included in communications is a 450MHz radio system.

•A Grass Valley 2-mix/effect, 24-input model 1600 system was selected, with plans to replace it with a 1680. To increase video flexibility, a single-channel DVE is planned for the production area as well.

•The audio area was designed for quick changes. Eleven of the 16 inputs on a Neve mixer are connected through a 25x25 routing switcher for input flexibility. Each input to the mixer is routed, pre-fader, to a 16x4 mix-minus matrix. Four mixer sub-masters and three masters all provide 0dBm outputs. An access panel on the outside of the truck provides input and output connections to the routing


And now
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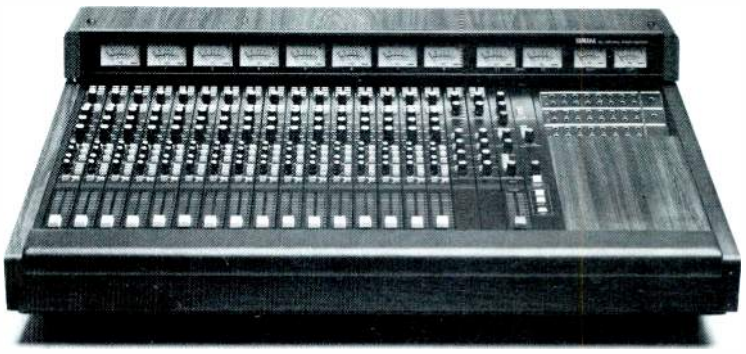
message
on
Yamaha's new
RM1608
recording
mixer.



# RM1608

## SPECIFICATIONS

TOTAL HARMONIC DISTORTION (T.H.D.)
Less than 0.1% at +4dB *output, 20Hz to 20kHz (all Faders and controls at nominal)

HUM & NOISE (20Hz to 20kHz) Rs = 150 ohms
(INPUT GAIN "–60")

| | |
|---|---|
| –128dB | Equivalent Input Noise (E.I.N.) |
| –95dB | residual output noise: all Faders down. |
| –80dB | (84dB S/N) PGM Master volume control at maximum and all CH PGM assign switches off. |
| –64dB | (68dB S/N) PGM Master volume control at maximum and one CH Fader at nominal level. |
| –73dB | (77dB S/N) STEREO Master Fader at maximum and all CH STEREO level controls at minimum level. |
| –64dB | (68dB S/N) STEREO Master Fader at maximum and one CH STEREO level control at nominal level. |
| –80dB | (70dB S/N) ECHO SEND volume at maximum and all CH ECHO volumes at minimum level. |
| –75dB | (65dB S/N) ECHO SEND volume at maximum and one CH ECHO volume at nominal level. |

CROSSTALK
–70db at 1kHz: adjacent Input.
–70db at 1kHz: Input to Output.

MAXIMUM VOLTAGE GAIN (INPUT GAIN "–60")

| | | | |
|---|---|---|---|
| PGM | 74dB: MIC IN to PGM OUT. | ECHO | 70dB: MIC IN to ECHO SEND. |
| | 24dB: TAPE IN to PGM OUT. | C/R | 74dB: MIC IN to C/R OUT. |
| | 34dB: ECHO RETURN to PGM OUT. | | 24dB: 2 TRK IN to C/R OUT. |
| | 14dB: PGM SUB IN to PGM OUT. | STUDIO | 74dB: MIC IN to STUDIO OUT. |
| STEREO | 74dB: MIC IN to STEREO OUT. | | 24dB: 2 TRK IN to STUDIO OUT. |
| | 24dB: TAPE IN to STEREO OUT. | | |
| | 34dB: ECHO RETURN to STEREO OUT. | | |

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Hum and Noise are measured with a –6dB/octave filter at 12.47kHz. equivalent to a 20 kHz filter with infinite dB/octave attenuation.
*OdB is referenced to 0.775V RMS.
• Sensitivity is the lowest level that will produce an output of –10dB (245mV), or the nominal output level when the unit is set to maximum gain.
• All specifications subject to change without notice.

The specs speak for themselves. But they can't tell you how natural, logical and easy the RM1608 is to work. All the controls and switches are logically arranged to help you get the job done quickly and accurately.

And in the tradition of Yamaha's sound reinforcement mixers, the RM1608 sets new standards of reliability as well as ease of operation. For complete information, write: Yamaha International Corporation, P.O. Box 6600, Buena Park, CA 90622. In Canada, Yamaha Canada Music Ltd., 135 Milner Ave., Scarborough, Ont. M1S 3R1.

YAMAHA

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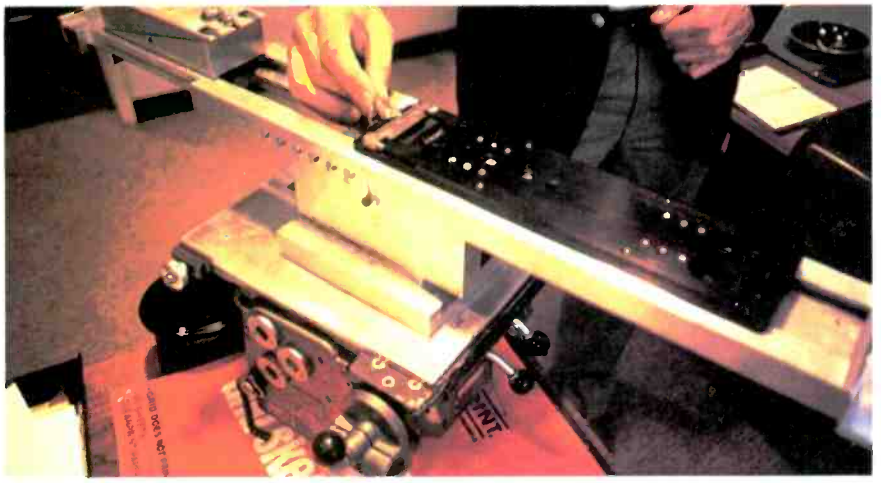
The video operator area provides controls for up to six hand-held cameras, along with monitoring and ancillary equipment for video, as well as microwave transmitter/receiver and antenna controls.



CBS technicians developed a quick-release camera mount to make tripod-mounted ENG cameras feel like *big* cameras.


Viewed from the back, Mobile Unit #10 carries its own air conditioners and may tow a power generator, if required.

switcher. Cartridge and cassette audio record/playback capability are included.

•The video area would house the video operator(s), camera controls and appropriate monitoring equipment. Also, two 1-inch video recorders, all video and pulse DAs, microwave transmitter/receiver equipment, microwave antenna remote controls and two tape operators are accommodated.

•No provision originally was made for source identification on camera inputs. However, after the first non-news remote (the Atlanta Open golf tournament), source ID generators were included, each capable of storing up to 80 different source addresses, each address consisting of eight characters.

•Plans were made for additional VTRs, character generators and other *unusual* equipment, in terms of the typical assignments, to be housed in a support vehicle. Mobile Unit #10, however, would contain five or six hand-held cameras with 30mm, 22mm and 17mm interchangeable lenses; two 1-inch video recorders with slow-motion control heads operable from the tape or production areas; a 2-way microwave ENG link system with telescoping tower; simplified, but sufficient audio with enough IFB capability, flexible routing and ease of lug-in connections; air conditioning; inputs for single- or 3-phase ac or a power generator; and the capability for being an almost totally self-contained remote production mobile unit.

# Field report: Dorrough Loudness Meter

By John Morris, chief engineer, WGBS/WLYF Radio, Miami, FL

Dorrough Electronics, best known for its audio processing equipment, is gaining recognition for its development of an innovative loudness meter for broadcast production rooms and air signal chains. WGBS/WLYF received two prototype models for evaluation before official introduction of the Dorrough Loudness Meter (DLM) model 40A about two years ago. The prototype and current production models differ cosmetically, but the circuitry and functions are the same.

The DLM is actually two meters combined in one. A dot/bar display-driver provides a variable LED bar graph and simultaneous single LED dot display. The bar-graph section forms the *persistence* scale, which is the primary indication of loudness. *Peak* information is indicated by the dot display, which "dances" above the persistence bar on the same scale indicating the peak level. By design, the peak LED is brighter than the persistence bar LEDs to eliminate any possible confusion.

The appearance of the meter is striking. The front panel consists of an arc of green, red and yellow rectangular LEDs in an etched transparent front panel with a solid black background.

The LED bar graph is scaled from −25dBm to +14dBm. The range from −25dBm to −11dBm reads in green LEDs. Yellow indicators cover the −10dBm to −2dBm and +2dBm to +11dBm regions, while red LEDs serve −1dBm to +1dBm and +12dBm to +14dBm levels. (See Figure 1.)

Reading the meter is fairly simple for program monitoring. The meter is adjusted with a sine wave for a zero indication (or −6dBm per channel for stereo) at the normal output level of the console. Program levels are adjusted so that the loudest material puts the top of the persistence bar high in the first yellow section, occasionally lighting a red LED. Normal material then will show peak indications in the upper yellow section. For most applications, if the persistence or peak indicators are frequently in the red, the level can be considered too high. This makes meter reading easy for VU-oriented operators. If the persistence bar stays mostly in the green zone with peaks below the peak yellow zone, the level can be considered too low.

Evaluation of most new equipment can be done on the test bench, but measuring the performance of a loudness meter is a task for which sophisticated test equipment is unnecessary. Because loudness is something perceived by the listener, it cannot be directly translated into voltage, power or sound pressure level. The only

bench test we could perform on the meter was its response to tones. The meter was calibrated to a reference sine wave of 1kHz at 0dBm. Precision attenuators were used to determine tracking over the range of −25dB to +14dB. Because each LED represents 1dB, no greater accuracy can be realized (remember, it is a loudness meter, not a voltmeter.) The DLM followed the step attenuators perfectly at all test frequencies. Various reference levels were tried from −20dBm to +10dBm, with the same results.

The next test focused on frequency response, and the results were surprising. I would have expected a loudness meter to be frequency-weighted. It was flat (within 1dB) from 30Hz to 18kHz, with a 2dB roll-off at 20kHz.

Other tests, with different waveforms, multiple frequencies, etc., were inconclusive and no performance patterns could be established. Another surprising fact was that, with a sine wave input, the peak indicator (the brighter LED) sat at the top of the persistence bar, rather than 3dB above it, as I would have expected. I think the surprise is the result of years of thinking in terms of rms and peak voltage, which apparently is *not* what the DLM is measuring.

We decided the best test would be to place it in a control room to see how it performed with program material and if its indication of loudness correlated with the perception of loudness from the speaker. The meter was bridged on the left and right outputs of the console (the DLM sums stereo internally) and adjusted so that +8dBm (0dB on the console meters) read −6dB for each channel. With both channels on, the meter read 0dB, which is the proper sum of in-phase stereo channels.

The meter begins to show its stuff with program material. We tried many different kinds of music. With mellow music or highly compressed records,

The front panel of the 40A loudness meter in the table-top format.



A prototype of the 40A mounted on top of the air console at WGBS-AM.

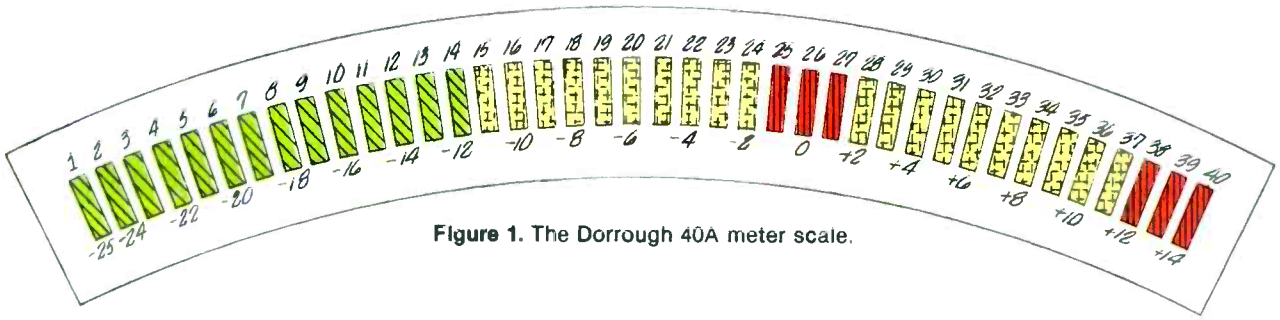


**Figure 1.** The Dorrough 40A meter scale.

the DLM tended to give the same indication as the VU meters, however, on material with percussion, staccato sounds or records with wide dynamic range, there was a marked difference. The persistence scale seemed to follow the perception of loudness, except in material with lots of peak energy, when the peak scale took over. We found that a good demonstration of the peak indicator was shown by tapping on a microphone. This sound makes quite a thump in a speaker, but will barely indicate on a VU meter. The DLM showed a low persistence reading, but the peak indicator hit the maximum limit (+14dBm).

The meter proved itself to me when I used it to look at a doughnut spot that had been running on the air for some time. It had a jingle open, voice insert and jingle close. It seemed to me that the voice portion of the spot was louder than the jingle. I had checked the spot previously and all the levels looked good. I checked the cart again with the DLM. The persistence scale showed the voice to be about 3dB louder than the jingle and the peak scale indicated a difference of 5dB. In more than 20 years of broadcasting, this is the closest match I have seen between meter and ear!

The real test of any equipment is how it operates on-line, and how it is received by the people who have to live with it. A DLM was installed in the WLYF (FM) control room. WLYF is a manually operated beautiful music station that places extreme emphasis on detail in execution and uses almost no compression. Any change in the control room usually is met with resistance, because the operating procedures must be exact and changes create unknown variables. The DLM was first looked upon with skepticism by the programming people, but after a week of operation, a slow transition from VU to DLM and *lots of listening*, we determined that by using the DLM as a reference, the voice-to-music, voice-to-production and voice-to-voice transition levels could be more closely controlled.

A second DLM was installed in the production room, and the age-old problem of level differences between cartridges seems to have disappeared. With the two DLMs in operation on WLYF, differences in relative loudness of various program components have ceased to be a problem, as long as the operators pay attention to the meter. Dorrough meters also have been installed in the WGBS-AM con-

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**Table I.**
**Manufacturer's specifications for the Dorrough 40A loudness meter**

| | |
|---|---|
| Input level | −30dBm to +20dBm |
| Input impedance | 20kΩ, balanced, 10kΩ, unbalanced |
| Power | 110Vac, 50Hz/60Hz |
| Size | 8⅛"x3"x6⅜", table-top style |
| Weight | 2¾ pounds |

trol and production rooms. The same transition with better board operation took place.

We found the DLM to be a useful engineering tool. It can be used to take a quick A-B look at the processing equipment to see the effects of compression and peak limiting or clipping. A piece of headroom equipment can be checked without taking it off line. A DLM can even be hooked to the output of a high quality tuner to see just how much louder "the other guy" really is.

The response of programming people to the introduction of the DLM was more positive than I would have believed. Programmers usually do not get excited about meters, but those who have worked with a DLM for a while consider it a necessity. Even notorious *pin slammers* run a better board with a DLM sitting on the console, perhaps because they can, for the first time, get a true visual indication of what they are hearing from the monitor speaker or headphones. Or perhaps it is because the meter is so easy to use. An engineer need only tell the jock "lots of yellow and not much red" to get good levels from the studio and to cut back on the compression.

The only problems that were encountered with the DLM were with panel lights in the prototypes, but the lights were redesigned and were working fine after a 2-month test. I found the internal display calibration controls to be touchy and interactive, although none of the meters have ever gone out of calibration.

Having seen a number of gizmos come and go, and having seen a number of products claim to be "the answer" and prove only to complicate the problem, I am not easily enthused by new, unproven products. The interest shown by seasoned professional programmers in the Dorrough Loudness Meter confirms my belief that it is a useful tool to programmers and engineers that will soon be considered indispensable in radio production and programming. I think it will soon find its way into television and recording, where it will find similar acceptance. The DLM offers us our first opportunity to stop measuring voltages and to start looking at what the listener actually is hearing.

**Editor's note:**

The field report is an exclusive **BE** feature for broadcasters. Each will be prepared by the staff of a broadcast station, production facility or consulting firm. The intent is to have the equipment tested on-site. The author is at liberty to discuss his research with industry leaders and to visit other broadcasters and/or the manufacturer to track down pertinent facts.

In each field report, the author will discuss the full applicability of the equipment to broadcasting, including personal opinions on good features and serious limitations – if any.

In essence, these field reports are prepared *by* the industry and *for* the industry. Manufacturer's support will be limited to providing loan equipment and to aiding the author if support is requested in some area.

It is the responsibility of **Broadcast Engineering** to publish the results of any piece tested, whether positive or negative. No report should be considered an endorsement by **Broadcast Engineering** for or against a product.

The equipment used in this report was obtained by the author directly from the manufacturer. Data for this equipment may be obtained by writing Dorrough Electronics, 5221 Collier Place, Woodland Hills, CA 91364.

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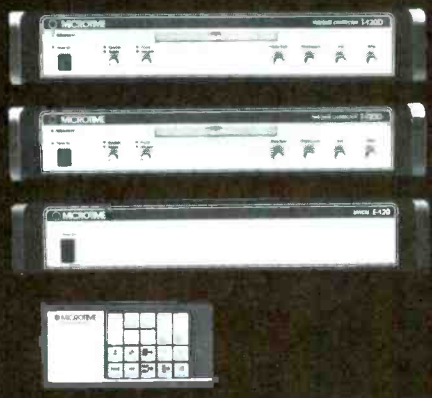

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So if you're looking for the best overall performance in a 1" tape, look for the one that's superior in 16 points, not just some of them. V-16 from Sony.

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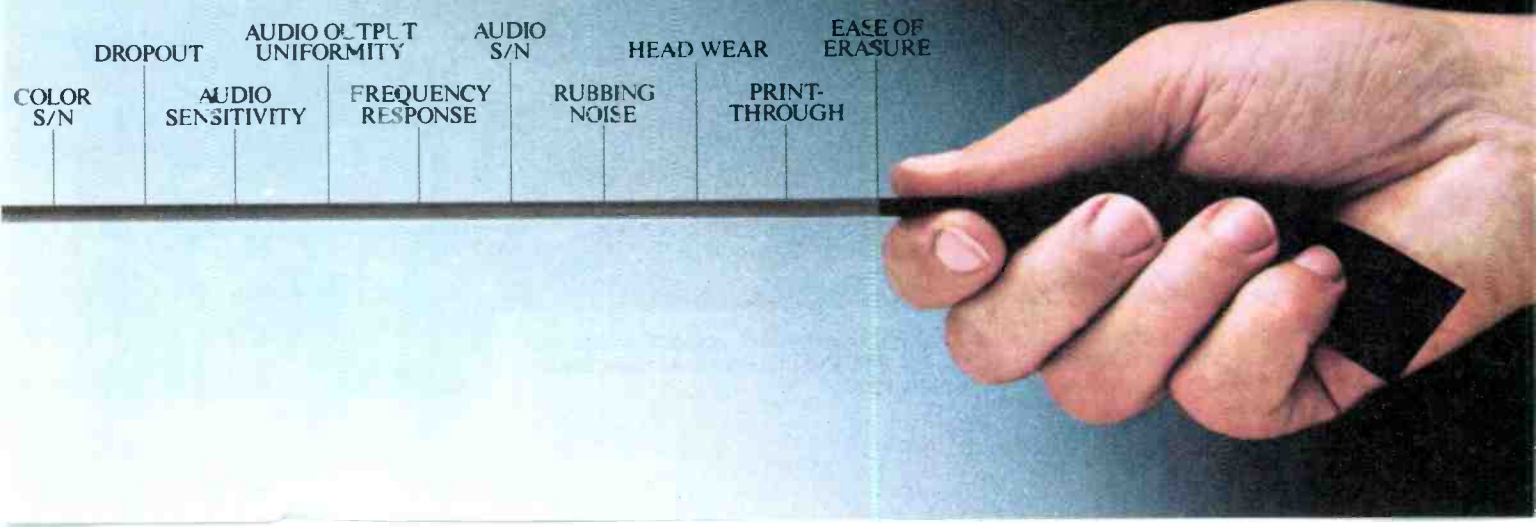


# SMPTE-'83/Los Angeles: Future sights and sounds

By Bill Rhodes, editorial director, and Carl Bentz, television editor

- Oct. 30-Nov. 4, 1983
- Los Angeles Convention Center
- 12,953 registered attendees
- 258 exhibitors

*Bigger and better than ever* describes the 125th SMPTE Technical Conference and Equipment Exhibition. With a theme of "Future Sights and Sounds," the conference gave its first strong emphasis to the quality of audio.

There were new dimensions to this convention that made it especially exciting. First, it being held in the convention center marks a precedent for this show, although next year's event in New York will return to hotels. Second, the attention to audio accompanying video brought audio people into the picture, in technical sessions and as exhibitors. Third, many exhibitors decided to launch new products at the SMPTE convention, where previously they had waited until the NAB show for such disclosures.

The move to the convention center was significant because it released exhibitors from space constraints associated with hotel locations. Also, with meeting rooms conveniently adjacent to the exhibits, attendees could participate easily in both important aspects of the fall event. Thus, all parties benefited from the high attendance in sessions and at the exhibits.

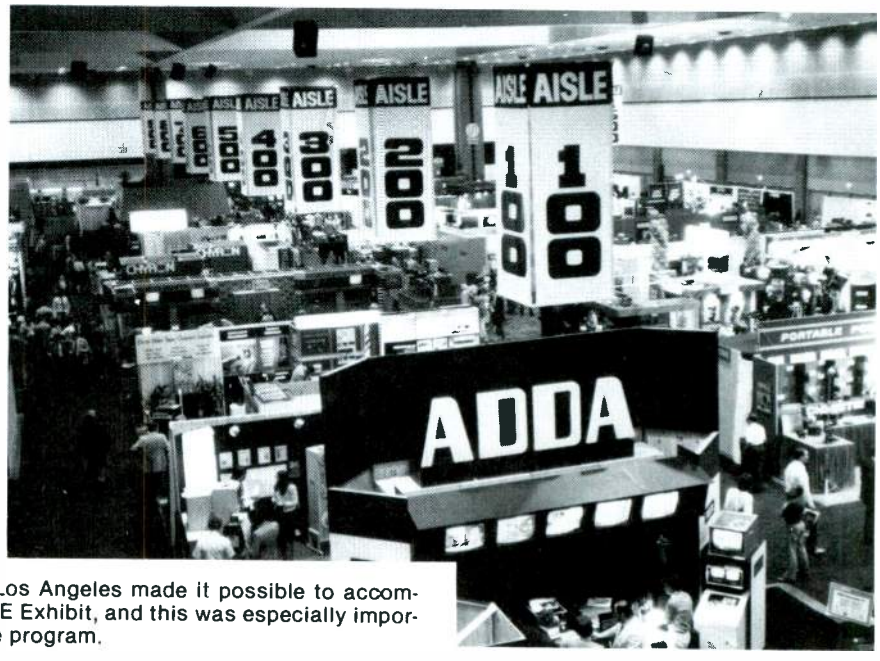
As previously noted, many companies used this year's SMPTE exhibition to introduce new products, an activity normally saved for the NAB convention. Harris Corporation led all exhibitors with 11 major equipment items. With the complement of audio, the new products kept every exhibit stand busy with prospective buyers.

### Conference opening

Before the official opening of SMPTE-'83, and continuing during the week, 28 Working Groups and Study Groups met to pursue a major purpose of SMPTE, the development of technical standards in the motion picture and TV industries. The official program began on Monday morning in the opening session, hosted by Bill Hogan, program chairman. Charles Kircher, general arrangements chairman, read portions of Charles Jenkins' address to the 1917 SMPTE convention. (See the *Editorial* on page 10.) Cooperative efforts toward standardization were called for even then.

In his remarks as guest speaker, Julius Barnathan, ABC Television, challenged the motion picture industry to take advantage of advances in video technology, rather than to fear magnetic tape and electronic visual displays. Barnathan said that through the dazzle and sophistication of new equipment we must keep *people* in mind. According to *Barnathan's First Law:* "The only answer to the question of what machines can do is: 'Nothing.' "

Referencing the *Wizard of Oz*, Barnathan said that Dorothy and friends found, as *we* must, that the wizardry of new equipment may not provide all the solutions to future problems. Creative people, using imagination and the right tools, make *magic*. An




The availability of the convention hall in Los Angeles made it possible to accommodate more exhibitors at the 125th SMPTE Exhibit, and this was especially important as audio became a serious part of the program.

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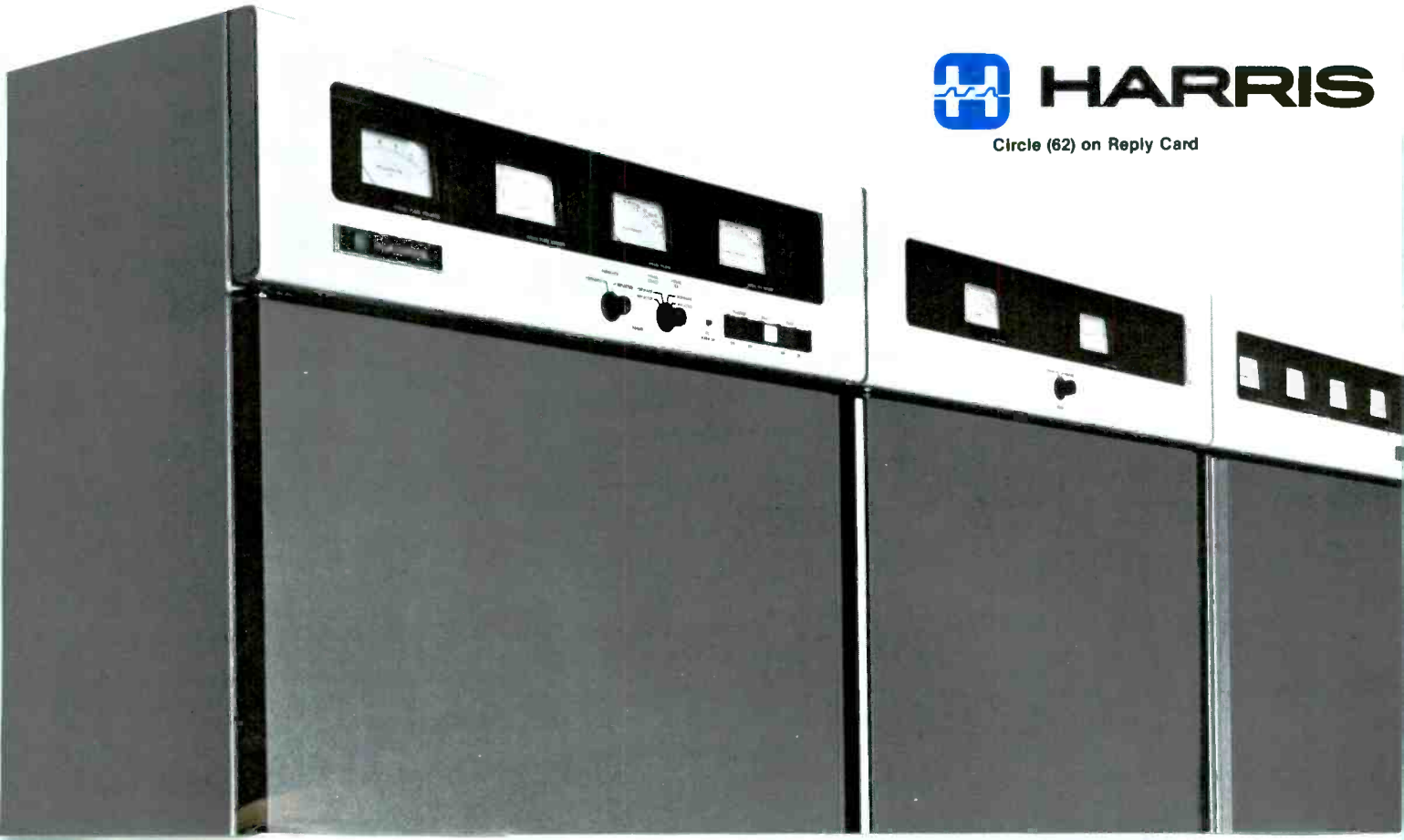


Olympic athlete who breaks a world record makes *magic*. It should be the most important standard of the visual transmission/display community to get that *magic* to the home screen and viewer, not to entertain itself with dazzling hardware.

The opening session also featured a review of the SMPTE's role toward the documentation and development of standards for creativity, presented by Roland Zavada, SMPTE engineering vice president. News to many was the involvement of the society in image display technology standardization for the medical community and NASA.

Linwood G. Dunn, ASC, concluded the session. He provided an interesting insight to many older films and their special effects procedures. Through the use of visual examples, Dunn's talk showed the simplicity of special effects possible with equipment available for TV production.

### Technical sessions

Beginning on Monday afternoon, and continuing until late Friday, the technical sessions offered 110 papers dealing with film and TV visual and audio engineering, plus production techniques and technology. The range of topics is indicated by the following session titles:

- Theater Audio Reproduction Technology
- Audio Post-production (two sessions)
- Laboratory Practices for Film (two sessions)
- Production for Film and Television
- Post-production for Film and Television
- High Definition Television
- New Technology for Video and Graphics
- New Technology for Projection and Display
- Component Television—Analog and Digital (two sessions)
- Production and Special Effects
- Advances in Video Technology (two sessions)
- Component TV Technical Presentation

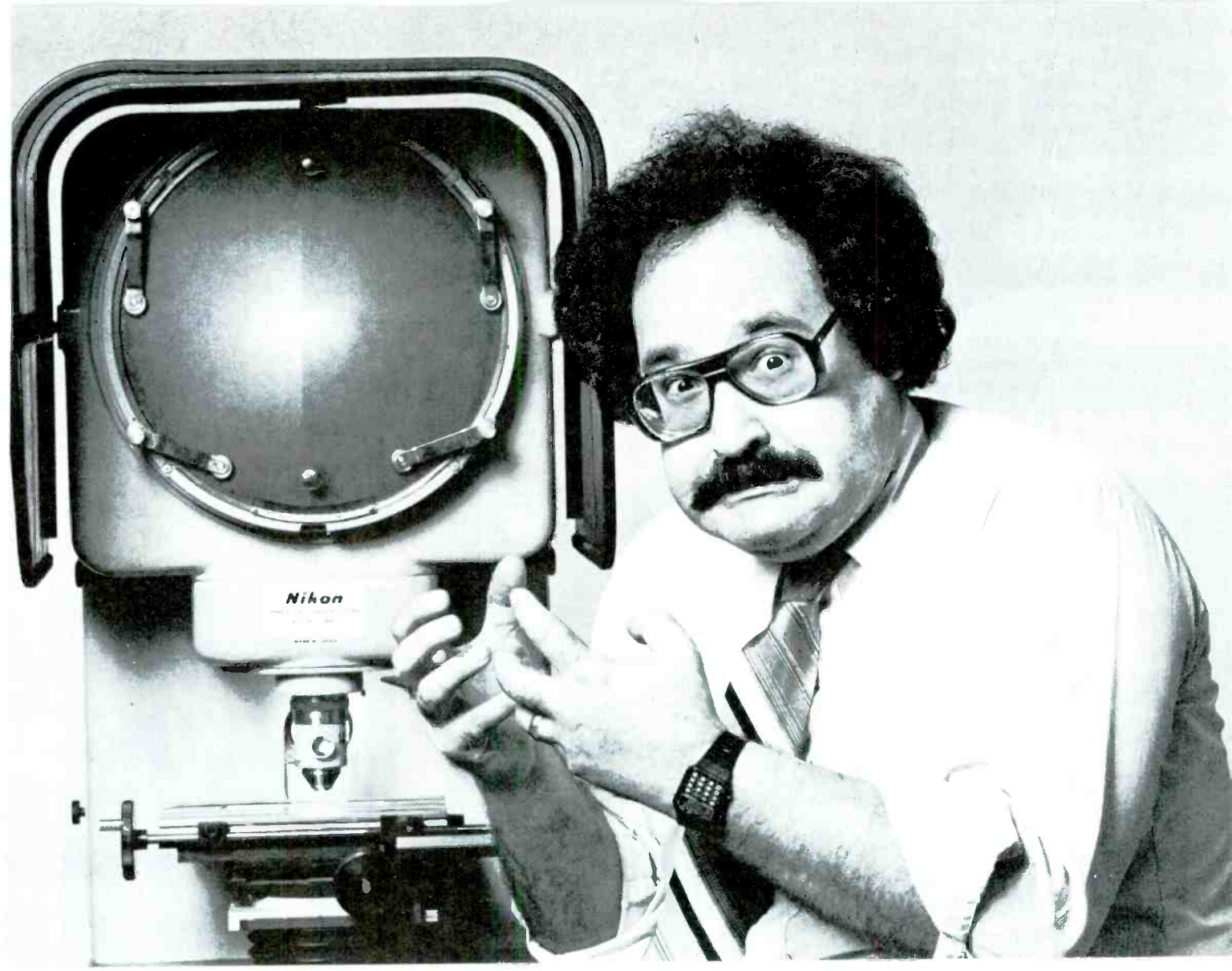
Although two sessions were always scheduled concurrently, there were few vacant seats in the meeting rooms.

### Awards luncheon

Leonard Coleman, SMPTE president, presided over the presentation of awards.

- **Karel G.M. Staes,** Agfa-Gevaert, Mortsel, Belgium, received the Agfa-Gevaert *Gold Medal Award* for his work throughout Europe in improving telecine equipment and the interface between motion pictures and TV imaging.
- The Progress Medal was presented to **Ray M. Dolby,** president, Dolby Laboratories, San Francisco, for his contributions in noise reduction systems, in theater sound, and improvements to audio and video systems. Dolby also is recognized by the award as a prime inventor of the videotape recorder.


Ray Dolby (left) receives the Progress Award from Coleman for his work in noise reduction, and audio and video systems.

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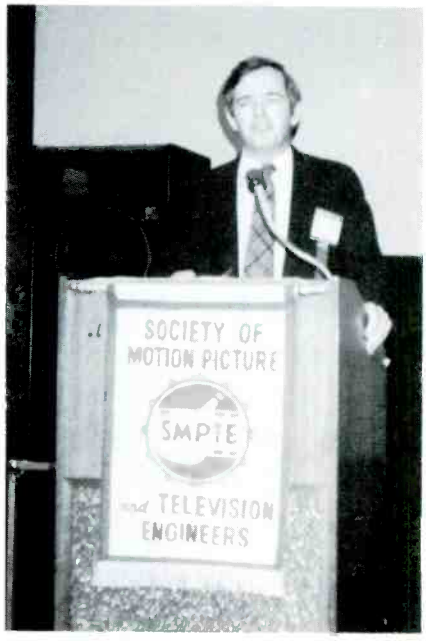
• **Frank Davidoff,** recently retired from CBS Television, accepted the David Sarnoff Gold Medal Award for his liaison efforts with the European Broadcast Union while chairman of the SMPTE task force on component digital coding. The award also cited his previous contributions toward TV signal synchronization, SCH-phase relationships and the design of a Rubidium standard.

• **Dr. Harold E. Edgerton,** Massachusetts Institute of Technology, was given the Eastman Kodak Gold Medal Award. The citation honors his contributions in stroboscopy and high speed photography, sonar for use in archeology, geology and underwater research and the design of watertight cameras and strobes for marine exploration.

• The John Grierson International Gold Medal Award was given to **Stefan Kudelski,** president of Kudelski SA, for his engineering achievements leading to the lightweight, portable Nagra recorder, crystal-controlled camera drives and high quality sound recording in remote locations.

• For contributions to the advancement of magnetic video recording,

Frank Davidoff (left) accepts the David Sarnoff Gold Medal from Leonard Coleman, SMPTE president.




William Hogan, program chairman, welcomes attendees to the conference.

**Michael O. Felix,** vice president of Ampex Advanced Technology Division, received the Alexander M. Poniatoff Gold Medal of Technical Excellence. Felix's efforts in the principles of highband recording resulted in vastly improved quality of color video recordings.

• The SMPTE Journal Award for a TV article was presented to **Ralph C. Brainard,** Bell Telephone Laboratories, **Dr. Arun N. Netravali,** Bell Labs Computer Technology Research Labs, and **Dr. D.E. Pearson,** electrical engineering science department, University of Essex, UK. The article was titled, "Predictive Coding of Composite NTSC Color Television Signals," *SMPTE Journal*, March 1982.

• Also presented at the luncheon were individuals elected to become

| | | | | |
|---|---|---|---|---|
| KDAY Los Angeles, CA | WLS Chicago, IL | KYW Philadelphia, PA | KNBR San Francisco, CA | WWDC Washington, D.C. |
| KABC Los Angeles, CA | WNOE New Orleans, LA | WFIL Philadelphia, PA | WPTF Raleigh, NC | KUGN Eugene, OR |
| KEEN San Jose, CA | WCAO Baltimore, MD | KENR Houston, TX | WCOS Columbus, SC | KODE Joplin, MO |
| KIBE San Francisco, CA | WQXR New York, NY | KKBQ Houston, TX | WWL New Orleans, LA | WESC Greenville, SC |
| KNEW Oakland, CA | WPTF Raleigh, NC | KTIA Ft. Worth, TX | KRDS Phoenix, AZ | KAAM Dallas, TX |
| WMAQ Chicago, IL | WGAR Cleveland, OH | KTSA San Antonio, TX | WISN Minneapolis, MN | WKIX Raleigh NC |
| WPLO Atlanta, GA | WSPD Toledo, OH | WISM Madison, WI | KRE Berkeley, CA | WAKY Louisville, KY |
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WFAU Augusta, ME

WAJR Morgantown, WV

WMGI

KOFI

WISE

Fellows of the society. They included **Ioan R. Allen,** Dolby Laboratories; **John L. Baptista,** MGM Laboratories; **Bernard Dickens,** CBS Technology Center; **Leo Diner,** Leo Diner Films; **Joseph A. Flaherty, Sr.; Ronald N. Haig,** consultant; **Thomas E. Mehrens,** Sony Broadcast Products; **Michael J. Milne-Smith,** Rank Film Laboratories; **Kerns H. Powers,** RCA Laboratories; **John P. Putlak,** Eastman Kodak; **Donald C. Rogers,** Warner Hollywood Studios; **Charles A. Steinberg,** Ampex; **Michael J. Strong,** World Wide Pictures; **Hirozo Ueda,** Fuji Photo Film; and **Howard E. Wilkinson,** Canadian Broadcasting Corporation.

### Progress in standards

One of the SMPTE's major contributions is its development of recommendations and standards that guide TV and motion picture progress. In an article on page 108, Blair Benson, **BE** TV technology consultant, reviews some of the efforts and trends that he saw in standardization at SMPTE-'83.

### Special activities

Among convention activities are announcements of business transactions and technical advances at press meetings and booth showings. Some SMPTE-'83 highlights are included here.

Julius Barnathan, president, ABC Broadcast Operations and Engineering, the first guest speaker at SMPTE-'83, challenges the industry to use new technologies to improve production efficiency and to control costs.

- **Tektronix** announced the signing of an agreement with ABC Television for the lease/maintenance of 57 model 110-S synchronizers, as well as a number of 1910 digital signal generators, 1740 waveform/vector monitors, 2445 portable oscilloscopes and other test/measurement equipment for the 1984 Summer Olympics.
- **RCA** and **Ampex** announced an OEM agreement in which RCA will market and support the Ampex VPR-80 video recorder. The unit appears as the model TH-400.
- **RCA** again showed, as it did at NAB-'83 and Montreux-'83, its CCD camera to the press and attendees.
- **General Electric Lighting Division** introduced an increased-efficiency lamp. The FWM Watt Miser Quartzline lamp allows a 650W unit to produce as much 3200K° light as a 1000W lamp with a 35% reduction in produced heat. Besides paying for its cost in terms of energy saved, the new lamp is considerably more comfortable for performers.
- **Harris,** besides introducing a number of new products on the floor, invited the press and attendees to private showings of new products being considered for the future.

# The brightness you need to show it big

## General Electric Professional Large Screen Video Projection

With General Electric's exclusive sealed light valve and sealed Xenon lamp system, in both color and monochrome General Electric Professional Large Screen Video Projectors, you can depend on sharp pictures from 2 to 25 feet wide. New high brightness models allow the room lighting viewers need to take notes and refer to written material.

The color projectors reproduce every color accurately, with the convenience of inherent color registration. General Electric's exclusive single gun, single optical path light valve system eliminates the need for manual color convergence.

Portable and flexible, the projectors are being used for a wide variety of applications, including front and rear projection. Our applications experts will tell you whether yours can be added to the growing list, which includes:

**Education:** Medical, dental, engineering, computer science instruction.

**Business:** Sales meetings, industrial training, product presentations, real-time display of computer-generated data, teleconferences.

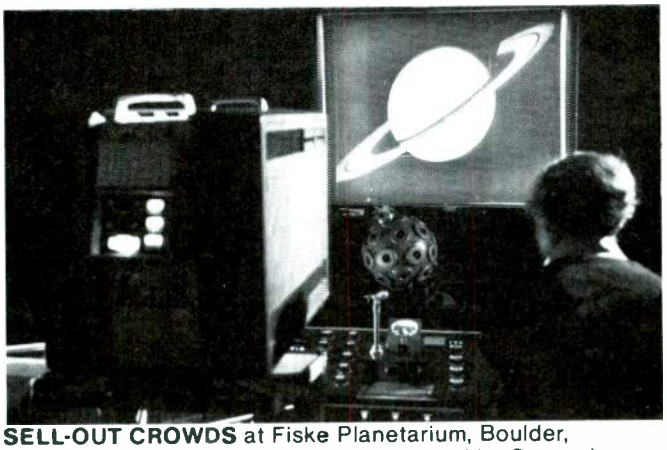
**Aerospace and Defense:** Situation displays, simulator training.

**Entertainment:** Theatre television, closed-circuit TV events, overflow crowds, special effects.

**Television Production:** Backgrounds for news programs, special effects, data display, program previewing.

Call or write: General Electric Company, Projection Display Products Operation, Electronics Park 6-206, Syracuse, NY 13221. Phone: (315) 456-2152. TWX 710-541-0498.

**NEWS BACKGROUND** at KBTV-TV, Denver, is displayed by General Electric PJ5055 Talaria projector.



**SELL-OUT CROWDS** at Fiske Planetarium, Boulder, watched live NASA transmission presented by General Electric projector.

## GE Professional Large Screen Television Projector Specifications

| Model | Light Output in Lumens | | | Resolution* in TV Lines per Picture Height | | Input Power Req. | | Scan Standards*** | Video Input** |
|---|---|---|---|---|---|---|---|---|---|
| | Open Gate Min. | Modulated TV, Min. | Modulated TV, Typ. | Min. Horiz. | Min. Vert. | Max. Watts | Max. Volt-Amps | | |
| **COLOR PROJECTORS** | | | | | | | | | |
| PJ 5050 | 1000 | 500 | 650 | 750 | 300 | 1100 | 1550 | 525 li./60 fps; 625 li./50 fps | (1) |
| PJ 5055△ | 2000 | 1000 | 1300 | 750 | 300 | 1750 | 2600 | 525 li./60 fps; 625 li./50 fps | (1) |
| PJ 5800 | 500 | 250 | 300 | 750 | 600 | 900 | 1350 | 875 lines/60 fps | (2) |
| PJ 5850 | 1000 | 500 | 600 | 750 | 600 | 1100 | 1550 | 875 lines/60 fps | (2) |
| PJ 5855△ | 2000 | 1000 | 1200 | 750 | 600 | 1750 | 2600 | 875 lines/60 fps | (2) |
| PJ 5100 | 500 | 250 | 300 | 750 | 650 | 900 | 1350 | 1023 lines/60 fps | (2) |
| PJ 5150 | 1000 | 500 | 600 | 750 | 650 | 1100 | 1550 | 1023 lines/60 fps | (2) |
| PJ 5155△ | 2000 | 1000 | 1200 | 750 | 650 | 1750 | 2600 | 1023 lines/60 fps | (2) |
| **MONOCHROME PROJECTORS** | | | | | | | | | |
| PJ 7000 | 900 | 600 | 750 | 800 | 400 | 900 | 1350 | 525 li./60 fps; 625 li./50 fps | (3) |
| PJ 7050 | 1500 | 1000 | 1250 | 800 | 400 | 900 | 1350 | 525 li./60 fps; 625 li./50 fps | (3) |
| PJ 7055 | 3000 | 2000 | 2400 | 800 | 475 | 1100 | 1550 | 525 li./60 fps; 625 li./50 fps | (3) |
| PJ 7800 | 900 | 600 | 750 | 800 | 650 | 900 | 1350 | 875 lines, 60 fps | (3) |
| PJ 7850 | 1500 | 1000 | 1250 | 800 | 650 | 900 | 1350 | 875 lines, 60 fps | (3) |
| PJ 7855 | 3000 | 2000 | 2400 | 800 | 650 | 1100 | 1550 | 875 lines, 60 fps | (3) |
| PJ 7100 | 900 | 600 | 750 | 800 | 750 | 900 | 1350 | 1023 lines, 60 fps | (3) |
| PJ 7150 | 1500 | 1000 | 1250 | 800 | 750 | 900 | 1350 | 1023 lines, 60 fps | (3) |
| PJ 7155 | 3000 | 2000 | 2400 | 800 | 750 | 1100 | 1550 | 1023 lines, 60 fps | (3) |

*Resolution measurements made with wide-band monochrome video input **Video Input Key (1) NTSC or RGB Standard, NTSC/PAL/SECAM Switchable as Option, (2) RGB, (3) Wide-Band monochrome. ***For use at other scanning rates, contact General Electric Projection Display Equipment Operation for special application/model information. Projector line voltage 105 to 132v or 190 to 260 volts 50/60 Hz except those marked ( △ ) above, which are 190 to 260 volts 50/60 Hz only.

GENERAL ELECTRIC

Circle (68) on Reply Card

# SMPTE exhibitors

This list of manufacturers from the SMPTE exhibit hall includes only those of specific interest to the broadcast industry. Reader Service Numbers are provided for convenience in obtaining data on new products introduced.

ADC Magnetic Controls .....(425)
ADDA .....(426)
ADM Technology .....(427)
AF Associates .....(428)
AMP Special Ind. .....(429)
Abekas Video Systems .....(430)
Adams-Smith .....(431)
Agfa-Gevaert .....(432)
Alan Gordon .....(433)
Alpha Audio .....(434)
Amperex .....(435)
Ampex .....(436)
Amtel Systems .....(437)
Angenieux .....(438)
Antenna Technology .....(439)
Anton-Bauer .....(440)
Anvil Cases .....(441)
Apert-Herzog .....(442)
Asaca/Shibasoku .....(443)
Assoc. Production Music ....(444)
Audico .....(445)
Audio & Design Recording ...(446)
Audio Developments .....(447)
Audio Kinetics .....(448)
Aurora Systems .....(449)
Automated Studio Tech. ....(450)
B & B Systems .....(451)
BGW Systems .....(452)
Belden Communications ....(453)
Beston .....(454)
Birns & Sawyer .....(455)
Bosch (Fernseh) .....(456)
Broadcast Video Systems ...(457)
Canare Cable .....(458)
Canon USA .....(459)
Central Dynamics .....(460)
Centro .....(461)
Century Precision Optics ....(462)
Cetec Vega .....(463)
Christie Electric .....(464)
Chyron .....(465)
Cinema Products .....(*)
Cinemills .....(466)
Cine 60 .....(467)
Cipher Digital .....(468)
Clear-Com Intercom Systems (469)
Coherent Comm. .....(470)
Colortran .....(471)
Comprehensive Video .....(472)
Control Video .....(473)
Convergence .....(474)
Cool Light .....(475)
Corp. Comm. Consultants ...(476)
Crosspoint Latch .....(477)
Datatron .....(478)
Datum .....(479)
Deselec .....(480)
Desisti Americas .....(481)
Digital Video Systems .....(482)
Digitrol .....(483)
Digivision .....(484)
Dolby .....(485)
Dreamdata .....(486)
Dubner Computer Systems ..(487)
Dwight Cavendish .....(488)
ECD Industries .....(489)
EECO .....(490)
EEV .....(491)
ESE .....(492)
Eastman Kodak .....(493)
Echolab .....(604)
Elector USA .....(494)
Euro Equipment .....(495)
Film Processing .....(496)
Film/Video Equipment .....(497)
For-A .....(498)
Fortel .....(499)
Frezzolini .....(500)
Fujinon .....(501)
Fuji Photo Film .....(502)
G & M Power Products .....(503)
GTE/Sylvania .....(504)
Garner Industries .....(505)
General Electric Lamps .....(506)
Grass Valley Group .....(507)
Gray Engineering .....(508)
Grumman Aerospace .....(509)
HEDCO .....(510)
Harris .....(511)
Harrison Systems .....(512)
Karl Heitz .....(513)
Hitachi Denshi America .....(514)
Hotronics .....(515)
Ikegami .....(516)
Image Video .....(517)
Industrial Sciences .....(518)
JVC .....(519)
KEM Elektronik Mechanik ...(520)
Kliegl .....(521)
Knox Video .....(522)
Kobold .....(523)
LTM .....(524)
L-W Int'l .....(525)
Lang Video Systems .....(526)
Lake Systems .....(527)
Leitch Video .....(528)
Lenco .....(529)
Lexicon .....(530)
Libin & Associates/Sanyo ...(531)
Lipsner-Smith .....(532)
Listec TV Equipment .....(533)
Lowel-Light Mfg. .....(534)
M/A-COM Video Systems ....(535)
MCI/Quantel .....(536)
Magnasync/Moviola .....(537)
Magna-Tech Electronic .....(538)
Matthews .....(539)
Maxell .....(540)
Merlin Engineering .....(541)
Micron Audio .....(542)
Microtime .....(543)
Midwest .....(544)
Minolta .....(545)
Mitchell Camera .....(546)
Mole-Richardson .....(547)
Motorola C & E .....(548)
Multi-Track Magnetics .....(549)
NEC America .....(550)
Nagra Magnetic Recorders ..(551)
Nalpak Sales .....(552)
North American Philips .....(553)
Nova Systems .....(554)
Nurad .....(555)
O'Connor Engineering .....(556)
Omnicron Video .....(557)
J. Osawa & Co. .....(558)
Osram Sales .....(559)
Otari .....(560)
PEP .....(561)
PRC .....(562)
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Q-TV .....(569)
Quanta .....(570)
Quante .....(571)
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RTS Systems .....(574)
Rank Cintel .....(575)
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Rupert Neve .....(578)
Sachtler .....(579)
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Sharp Electronics .....(581)
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Sigma Electronics .....(584)
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Soundcraft Electronics .....(587)
Sound Ideas .....(588)
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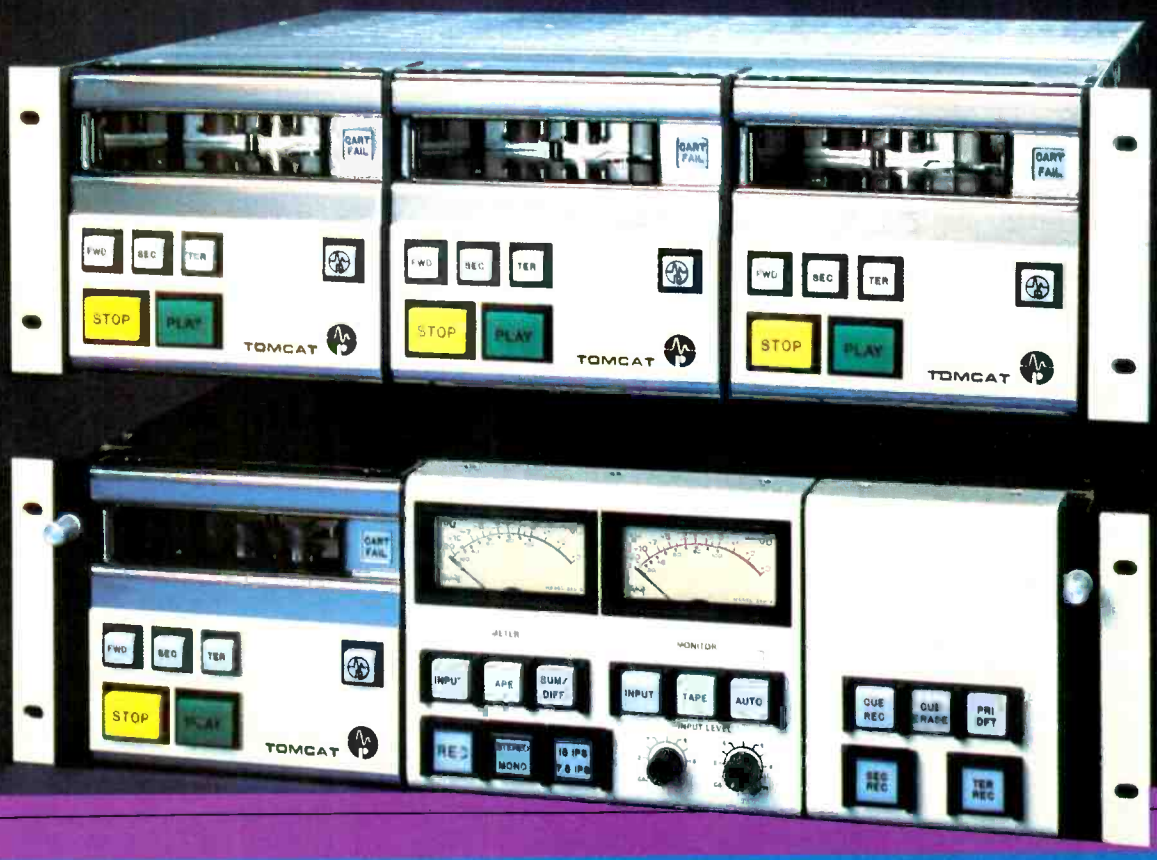
Steenbeck .....(591)
Stellavox .....(592)
Strand Century .....(593)
Studer Revox .....(594)
Symtec .....(595)
TASCAM/TEAC .....(596)
Tektronix .....(597)
Tele-Cine .....(598)
Telescript .....(599)
Tele-State Associates .....(600)
TV Equip. Assoc. .....(601)
Tentel .....(602)
Theatre Vision .....(603)

*For more information, contact Cinema Products Corporation, 2037 Granville Ave., Los Angeles, CA 90025.

*Continued on page 102*

Why is TOMCAT in use by ABC, Bonneville, Capital Cities, Capitol, Cox, Gannett, GE, Katz, Meredith, Metromedia, Mutual, NBC, RKO, Sudbrink, Susquehanna, Westinghouse and other broadcasters who demand the best? .....

# BECAUSE IT SOUNDS GREAT!

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Circle (117) on Reply Card

The new professional modular CD control/player system is one of several products discussed by Sony at its press meeting.

William Connolly, president, Sony Broadcast Products, welcomes the press to Sony's presentation on broadcast market trends.

Representatives from Harris Studio Systems Division also were available at the suite to discuss new products introduced at the exhibition hall. In the video area, two options were shown for the enhanced IRIS still-store. One, the IRIS Composition Station (ICS), adds production effects to the still-store system, while the second, the 650 frame-store, includes a 4-frame memory and is usable from two of up to six work stations attached to the IRIS. Time base correction and frame synchronization also were covered by introductions of the 550 TBC and 650 synchronizer. The TC-90 camera was shown with the *smart* option, which improves operational simplicity of the ENG unit. Also in the video area was the VG Electronics TTS teletext system, for which Harris is the US representative.

In audio equipment, two new models of the Medalist audio console included 8- and 10-channel capability for on-air/production applications.

Harris Microwave Video was represented by the new 13GHz microwave link equipment, designed with CATV applications in mind.

• **Hitachi** held a ceremony, open to all conferees, with presentations by factory people from Japan and by Arnold Taylor, its new vice president for sales and marketing.

• **Sony** made several announcements at the convention. First, William Connolly, has been named president of Sony Broadcast Products. Second, Sony has entered the test market field with its HDTV test signal generator. Third, the Betacam camera/recorder now numbers more than 1000 systems in 20 countries. Fourth, a strong statement of Sony's position regarding ½-inch vs. ¼-inch tape systems was presented by Larry Thorpe, manager, studio products. In introducing Betacam, he said, "Sony offered evolution...an orderly, logical enhancement to facilities using professional U-matic systems. While Betacam enhances the present ¾-inch world, it too has been planned to evolve into a higher-performing total ½-inch system." The bottom line of his address, as interpreted by the press, is that Sony will concentrate its efforts on the ½-inch systems and leave the ¼-inch area for others to pursue. Fifth, orders for U-matic videocassettes and 1-inch tape for broadcast and industrial markets have increased significantly.

As it did at AES-'83/New York, Sony introduced its new professional CD modular system for multiple compact disc players, the CDS-3000 control unit and the CDP-3000 player.

Sony's new BVH-2500, which represents a significant advance in Type C technology, was also shown. In addition to functioning as a standard VTR, the BVH-2500 uses a refined form for time lapse (delta time recording) for computer graphics and animation applications.

# Microdyne Satellite Receiving Equipment is backed by the Most Responsive Service Policy in the Industry

Microdyne equipment is designed to the highest achievable standards of reliability and we are very successful in meeting these standards.

But even Microdyne products fail on occasion. So we provide our customers with this assurance.

If your Microdyne equipment fails, ship it to our service depot. Within 48 hours of our receiving it, it will be repaired and on its way back to you. If we cannot repair it within 48 hours, we ship a new replacement unit.

If your equipment is in warranty, there is no charge for this service.

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**Coming events**

**Jan. 14-18**
Association of Independent Television Stations (INTV) 11th Annual Convention, Los Angeles, CA

**Jan. 20-23**
COMMTEX/NAVA, Dallas, TX

**Jan. 29-Feb. 1**
National Religious Broadcasters (NRB), Washington, DC

**Feb. 10-11**
SMPTE 18th Winter TV Conference, Montreal, Canada

**Feb. 10-14**
National Association of Television Programming Executives (NATPE) 21st Annual Conference, San Francisco, CA

**March 27-28**
LPTV West, Anaheim, CA

**March 27-30**
Audio Engineering Society (AES), Paris, France

**April 8-12**
NPR Annual Conference, Arlington, VA

**April 29-May 2**
NAB 62nd Annual Convention, Las Vegas, NV

**May 3-6**
ITVA, Las Vegas, NV

**May 12-15**
Audio Engineering Society (AES), Anaheim, CA

**May 20-23**
Broadcast Financial Management Association (BFMA) 24th Annual Conference, New York, NY

**May 30-June 2**
American Women in Radio and Television 33nd Annual Convention, Chicago, IL

**June 3-6**
National Cable Television Association (NCTA) Annual Convention, Las Vegas, NV

*Continued from page 98*

# World's most accommodating camera.

You'd expect the Ikegami HK-322 to make beautiful, crisp, color-true pictures. It does. You'd also expect it to offer the latest in computer set-up convenience with its third generation microprocessor control plus comprehensive operational automatics and 8 scene files and 8 lens files. It does that too. But what you might not expect, is just how incredibly flexible the HK-322 is.

Consider that you can specify 30mm or 25mm Plumbicons,* and for each size select standard, Anti Comet Tail or diode gun operation. The same holds true for cabling. You choose from triax, multicore or, if you'd like, specify an HK-322 version that's compatible with your existing TV 81 cable. You also have a choice of optional camera control configurations.

There are also some unique features such as trim files that compensate for differences between the internal pattern projector and the external scene caused by chromatic aberrations in the lens.

Finally, compare its performance to any other camera. An honest resolution of 800 lines at center, a practically noiseless S/N ratio of up to −58 dB and a virtually unmeasurable .05% registration error over the entire raster.

Best of all, the HK-322 is ready right now to fit into *your* idea of an ideal studio/field camera. Without compromise, but with plenty of accommodation.

Contact Ikegami. See for yourself.
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**Ikegami** HK-322

**Circle (73) on Reply Card**

# HOW TO AVOID A FORMAT FAUX PAS.

There has been mounting confusion over which combination camera/recorder format to choose. And for obvious reasons. With the addition of so many new formats, nobody wants to make a mistake that can range from thousands to millions of dollars.

But if you follow these simple steps, you'll never get caught with your wallet, or your neck, in the proverbial wringer.

LOOK FOR EVOLUTION. NOT REVOLUTION.

Apparently, many manufacturers feel it's in their best interest to have you replace your existing U-matic™ equipment with their new stand-alone systems.

At Sony, we think it's foolhardy to leave you no option but to make a 180° turn and orphan your existing editing suite. So we designed Betacam™ as an evolutionary system. One that easily and efficiently plugs into what's come before.

This Sony theory of peaceful coexistence allows you to enter the world of one-piece camera/recorders at your own pace. And in this way you not only protect your existing U-matic investment. You gain field equipment that's more compact and portable, and a dramatic improvement in technical performance. Furthermore, dramatic improvements are also on the horizon for Sony U-matic. The evolution of both these formats is planned and it's total.

FIND A ½" SYSTEM THAT'S WHOLE.

For those of you who want to capitalize on the outstanding technical performance of an overall ½" system, scrutinize carefully the complete system from Sony.

After all, who else has a portable color field player like our BVW 20? Or our ½" edit-recorder, the BVW 40, which looks and feels like the Sony U-matic equipment you're accustomed to using? And who else promises an ongoing commitment to ½" system expansion and refinements that you will see next year and every other year?

BE PENNY-WISE
WITHOUT BEING POUND-FOOLISH.

The Sony Betacam system has proven itself on both the


firing line in Nicaragua and the fifty-yard line at the Super Bowl.

That's because our format was chosen to be optimum for both ENG and EFP, which is why Betacam is not just the lightest, smallest, most compact ½" system you can buy (as well as the least expensive), but its picture quality rivals 1".

Whatever you've been told you might gain from the various ¼" formats, when and if they become available, will be totally erased by the fact that ¼" is not at all suitable for high-quality EFP. Which means, if you purchase ¼" for ENG, you'll no doubt have to purchase an entire new system for field production.

THERE'S SAFETY IN NUMBERS.

With over 1,000 Betacams already sold to key end users, Betacam is virtually the worldwide de facto standard now.

We believe Betacam is outselling all the others by such a wide margin because it's better than all the others by such a wide margin. It's the only camera/recorder that focuses on the big picture. A picture that includes your existing investment; your need for both ENG and EFP; your desire for light weight and high quality; and a total system approach.

If you want to make sure you'll own the standard of excellence in the years ahead, insist on the camera/recorder from the people who created the standard of excellence in the years past.

For a demonstration, in New York or New Jersey call (201) 833-5350; in the Northeast/Mid-Atlantic (201) 833-5375; in the Mid-west (312) 773-6045; in the Southeast (404) 451-7671; in the Southwest (214) 659-3600; and in the West (213) 841-8711.

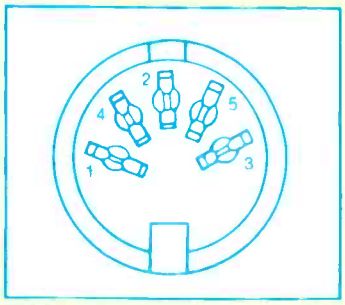
SONY®
Broadcast

# Using a minicomputer for testing

By Bill Graham, audio-visual supervisor, Mutual Life Assurance Company of Canada, Waterloo, Ontario

## Program

```
  5   GRAPHIC 1
 10   POKE 36864,133
 20   COLOR 2, 0, 5, 6
 25   SOUND 0, 0, 0, 0, 0
 30   FOR X = 0 TO 300 : DRAW 2, X, 0 TO X, 1021 : NEXT X
 40   FOR X = 750 TO 1021 : DRAW 3, X, 0 TO X, 1021 : NEXT X
 50   SOUND 128, 0, 0, 0, 4
 60   GOSUB 500
 70   SOUND 158, 0, 0, 0, 4
 80   GOSUB 500
 90   SOUND 188, 0, 0, 0, 3
100   GOSUB 500
110   SOUND 218, 0, 0, 0, 3
120   GOSUB 500
130   SOUND 248, 0, 0, 0, 3
140   GOSUB 500
150   SOUND 0, 0, 231, 0, 3
160   GOSUB 500
170   SOUND 0, 0, 241, 0, 4
180   GOSUB 500
190   SOUND 0, 0, 251, 0, 15
200   GOSUB 500
210   SOUND 0, 0, 0, 0, 0
220   GO TO 220
500   FOR T = 1 TO 2000 : NEXT T : RETURN
```




| PIN # | TYPE | NOTE |
|---|---|---|
| 1 | +5V regulated | 10mA max. |
| 2 | GND | |
| 3 | audio | |
| 4 | video low | |
| 5 | video high | |

**Figure 1.** The Vic-20 audio-video output.

A computer is a handy tool in the lab, but justifying one to management can be a problem. However, suppose it would perform some useful testing. That could make it another story. The VIC-20 computer may seem like a basic home computer, but it has a feature that makes it useful for cable companies, TV stations and remote crews—one memory location. When you enter POKE 36864,133, it goes into *interlace mode* and you can gen-lock to it. With a proc amp, the output is good for simple testing and production work.

Add the VIC super extender cartridge and you can use background colors and basic graphics, with sound (optional). By making use of the keyboard, the crew can send messages down the line during setup, etc. Now that a small computer is available with interlace for under $1000 with the extras, the possibilities are limited only by your imagination.

The program shown here will make color bars in red, green and blue and a series of test tones. The luminance levels of the colors do not look right on the vectorscope, but using it will help in setting the phase on the proc amp and will give a visual reference for some tests. The tones are all ±1dB.

These are tones that suited my testing. It is easy for you to change them to suit your needs. The last number in each sound statement controls the level of the sound. If you change the tones you may want to put a meter on the output and adjust each level for ±1dB.

In Figure 1, PIN 3's audio is a nominal 10kΩ output. PIN 4 or PIN 5 provide video. Use one or the other depending on your needs. Check it out with a scope. I made up a cable with a DIN plug on one end, a box with an RCA phono socket for audio, and two BNC connectors for video. Using it with a proc amp cleans up the levels.

When you get to know the machine a little better, explore the user ports. With these you can use the computer to remotely control various devices and to set up a program to do it when you are not there.

# MEK-1000

## MULTI EFFECT KEYER


# Make a splash on the screen Add some flash to your titles

NTI's new Multi Effect Keyer **MEK 1000** can provide a lightning halo effect around your titles that up to now involved an expensive, difficult, and time-consuming process. The **MEK 1000** is the world's first unit that delivers this stunning effect digitally and instantly to either title character input or chroma key signals. The **MEK 1000** can also color each individual character in your titles differently. Again, digitally and instantly.

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# TV standards: SMPTE efforts

By Blair Benson, TV technology consultant, Norwalk, CT

The question of *standards* was the hottest topic at SMPTE-'83/Los Angeles. It dominated the program with more than 10 papers directly concerned with the development of standards and the practical application in equipment design and program production.

Roland Zavada, SMPTE engineering vice president, emphasized standardization in the opening session in a thought-provoking and informative address titled, "Documenting Technology for Creativity." His discussion centered on the role of engineering societies as well as governmental regulatory organizations in documenting technology, and the critical balance between standardization and freedom of creativity. Zavada questioned whether future technology will concede to effective documentation or whether standards are too restrictive to inventiveness and creativity. He suggested that this dilemma may be the case for regulatory standards, but does not apply to voluntary standards arrived at by consensus.

The SMPTE has been a major force, worldwide, in reconciling a variety of already-developed commercial approaches to a particular technology; in developing a workable set of standards; and in recommending practices that do not inhibit use and further development of crucial technologies. An example of the SMPTE's success in this type of standards work is the Type C, 1-inch videotape format.

### SMPTE study group concept

More recently, under Zavada's guidance, concurrent with the traditional standards committee activity, the society has instituted a means to contribute constructively to evolving technologies before formal standards committee documentation. This is the *study group* concept, under the direction of a new technology engineering committee.

Study group features are as follows:

- no jurisdictional restraint;
- *open* or *selected* membership;
- *engineering* or *investigative* function;
- preliminary role to standards documentation;
- freedom from antitrust concerns; and
- an effective record for future consideration.

The effectiveness and kind of accomplishment that can evolve from the study group process has been the engineering development and leader-

ship in a coordinated national position with the CCIR (International Radio Consultative Committee) in arriving at a world digital video specification. The value of this work was confirmed by an Emmy Award from the National Academy of Television Arts and Sciences this year to the SMPTE, shared with Zavada and committee chairmen Charles Ginsburg, Robert Hopkins, Kenneth Davies and Frank Davidoff.

**Table I.**
**Committee activities coordinated by the SMPTE engineering vice president**

| | |
|---|---|
| ACVL | – Association of Cinema and Video Laboratories |
| AES | – Audio Engineering Society |
| ASC | – American Society of Cinematography |
| ATSC | – Advanced Television Systems Committee |
| EIA | – Electronic Industries Association |
| FPR | – Foundation for the Preservation of Recordings |
| IEEE | – Institute of Electrical and Electronics Engineers |
| IES | – Illuminating Engineering Society |
| ISCC | – Inter-Society Color Council |
| ISCETP | – Inter-Society Committee for the Enhancement of Theatrical Presentation |
| JCIC | – Joint Committee on Inter-Society Coordination |
| NAB | – National Association of Broadcasters |
| NATO | – National Association of Theatre Owners |
| NAVA | – National Audio-Visual Association |
| NCTA | – National Cable Television Association |
| RIAA | – Recording Industry Association of America |
| SPSE | – Society of Photographic Scientists and Engineers |

### National standardization

The American standards efforts of the SMPTE are channeled through the American National Standards Institute (ANSI) committees—one for motion pictures (PH-22) and the other for TV magnetic recording (C-98). To carry out the responsibilities assigned to SMPTE by ANSI, liaison and cooperation must be maintained with many professional societies, trade organizations and committees. Those the engineering vice president currently must coordinate are listed in Table I.

### International standardization

Internationally, the SMPTE deals principally with the International Standards Organization (ISO) and the International Electrotechnical Committee (IEC); five committees from each. But, there also are a number of other international and overseas organizations with which SMPTE has joint considerations of film and televi-

**Table II.**
**International organizations with which the SMPTE coordinates meetings**

| | |
|---|---|
| BKSTS | – British Kinematograph, Sound and Television Society |
| BSI | – British Standards Institute |
| CCIR | – International Radio Consultative Committee |
| CIE | – International Commission on Illumination |
| EBU | – European Broadcasting Union |
| ICHSPP | – International Congress on High-Speed Photographic and Photonics |
| IEC | – International Electrotechnical Committee |
| ISO | – International Standards Organization |
| UNIATEC | – Union International del Association Techniques Cinematographiques |

sion practices. (See Table II.)

### The JCIC

Although ANSI oversees all national standards activities, one effective mechanism for organizing and coordinating TV standardization was set up in 1951 to assist and augment its formal jurisdiction. Named the Joint Committee on Intersociety Coordination (JCIC), initially it was composed of appointed representatives from the IRE (Institute of Radio Engineers), NARTB (National Association of Radio and Television Broadcasters), RMA (Radio Manufacturers' Association) and SMPTE. Presently, the membership consists of the EIA (former RMA), IEEE (former IRE), NAB (former NARTB), NCTA and SMPTE.

The JCIC does not develop standards, but instead answers the organizational questions as to which of the member societies should handle the various subjects presented for consideration. Some of the more significant recommendations by the JCIC since its organization include the following:

**SMPTE**—Videotape, color uniformity, film and slides, studio lighting, color films and test patterns.

**EIA**—Monitor performance, receiver measurements, multichannel TV sound.

**NAB**—Ancillary signals.

**IEEE**—Video levels and waveform monitors, and video measurement techniques.

In 1964, the JCIC requested that ANSI (then ASA) assume the responsibility for its activities. This was accepted by ANSI and reaffirmed in 1982.

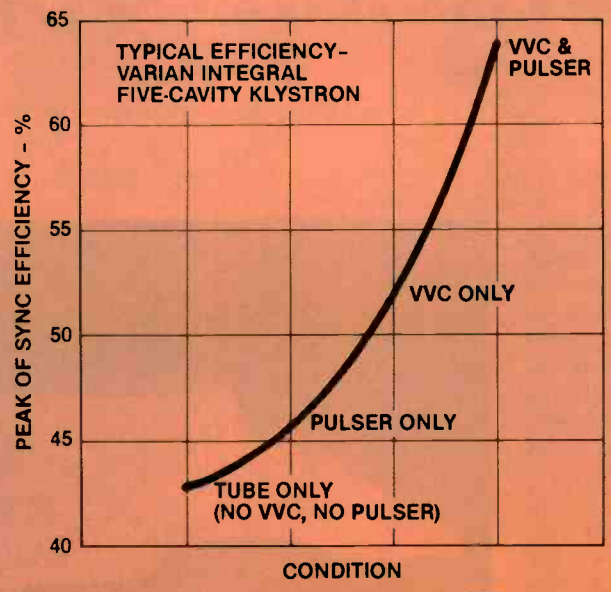
### HDTV

In 1977, the study group approach was used to undertake a technical appraisal of high definition television and to provide a base of information for further work by the industry in developing appropriate standards. In the fall of 1979, the group's report provided detailed information on worldwide developments in HDTV. The group remained dormant for a year while additional technical developments emerged, and then was reactivated to investigate fundamental questions regarding aspect ratio, compatibility with existing color systems and other HDTV-system proposals.

The Study Group responded to the accelerated interest and activity in 1982 by forming four subgroups to investigate the problem under the disciplines of production, psychophysics, distribution and equipment. Also, a steering committee was formed to focus the activities of the subgroups and to schedule the timing of report preparation for the high definition, now appropriately renamed the Advanced Television Systems (ATS) Study Group.

Because of the broad, national and international implications of HDTV, after lengthy discussions the JCIC unanimously agreed that a national industry committee, along the lines of the National Television Systems Committee (NTSC), should be formed. This has been implemented, with William Henry, a former FCC chairman, appointed as chairman, and Richard Green as executive director. Because of the significant impact that action by the ATS will have on broadcasting in the United States, as well as worldwide, the SMPTE recommended that the NAB be the secretariat for this initial, extremely important standards effort.

**Editor's note:**
As 1984 unfolds, **BE** will maintain a dialogue of progress on US and international standards as they affect broadcasting. Interested readers who want to shed some light on this progress, or to air their views, may send their contributions to the Standards Editor, **Broadcast Engineering**, P.O. Box 12901, Overland Park, KS 66212.





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# NC TV stations form new

By Patti LeMieux, writer/producer, B.F. McClain Productions, Asheville, NC

Four progressive North Carolina TV stations have formed a unique cooperative network known as the Carolina News Network. The system, which became operational in May 1983, is the first cooperative microwave link between competitive stations located in adjacent markets in the United States. Using an array of M/A-COM MVS microwave equipment to link them together, WFMY in Greensboro, WRAL in Raleigh, WSOC in Charlotte and WWAY in Wilmington now are capable of pooling their resources to provide each other with in-depth stories from outside their normal news-gathering areas.

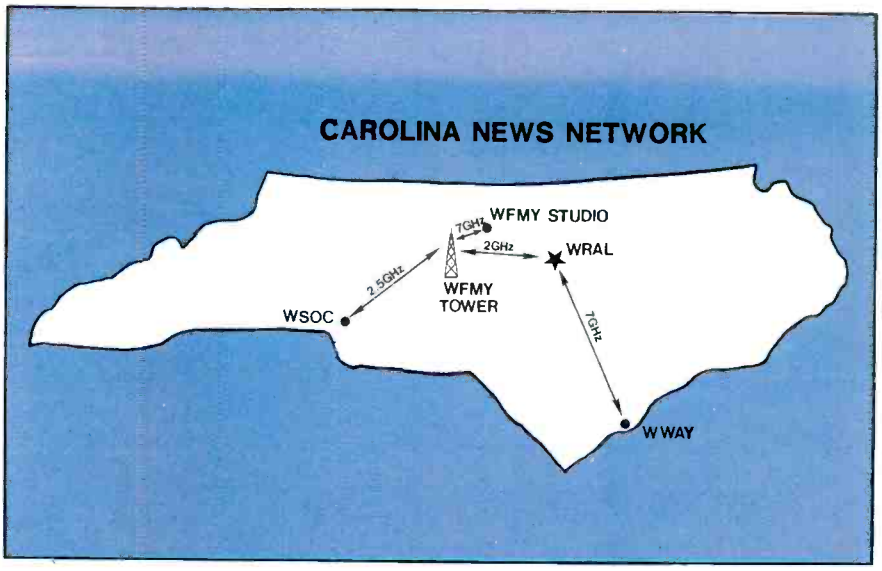
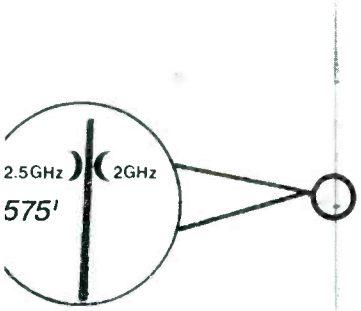



**Figure 1.** The Carolina News Network, using M/A-COM MVS microwave equipment, links WSOC in Charlotte, NC, WFMY in Greensboro, NC, WRAL in Raleigh, NC, and WWAY in Wilmington, NC.

### Birth of a network

Steve Grissom, who was news director at WRAL at the time the project began, recounted the birth of the network. "We had the idea to form a cooperative consortium to deliver

# network




The heart of the system is WFMY's 1941-foot tower, where two M/A-COM systems link Charlotte and Raleigh to Greensboro.

material via satellite," he said. "Because there was no uplink available locally, tapes would have to be sent to Atlanta. This, added to the expense of buying satellite time, made satellite distribution costs prohibitive. It became clear that microwave was the way to go. We would have a link, available 24 hours a day, that would become very cost-effective both in the short term and the long term." What has evolved is a mininetwork that speeds stories from one North Carolina region to another like an electronic railroad.

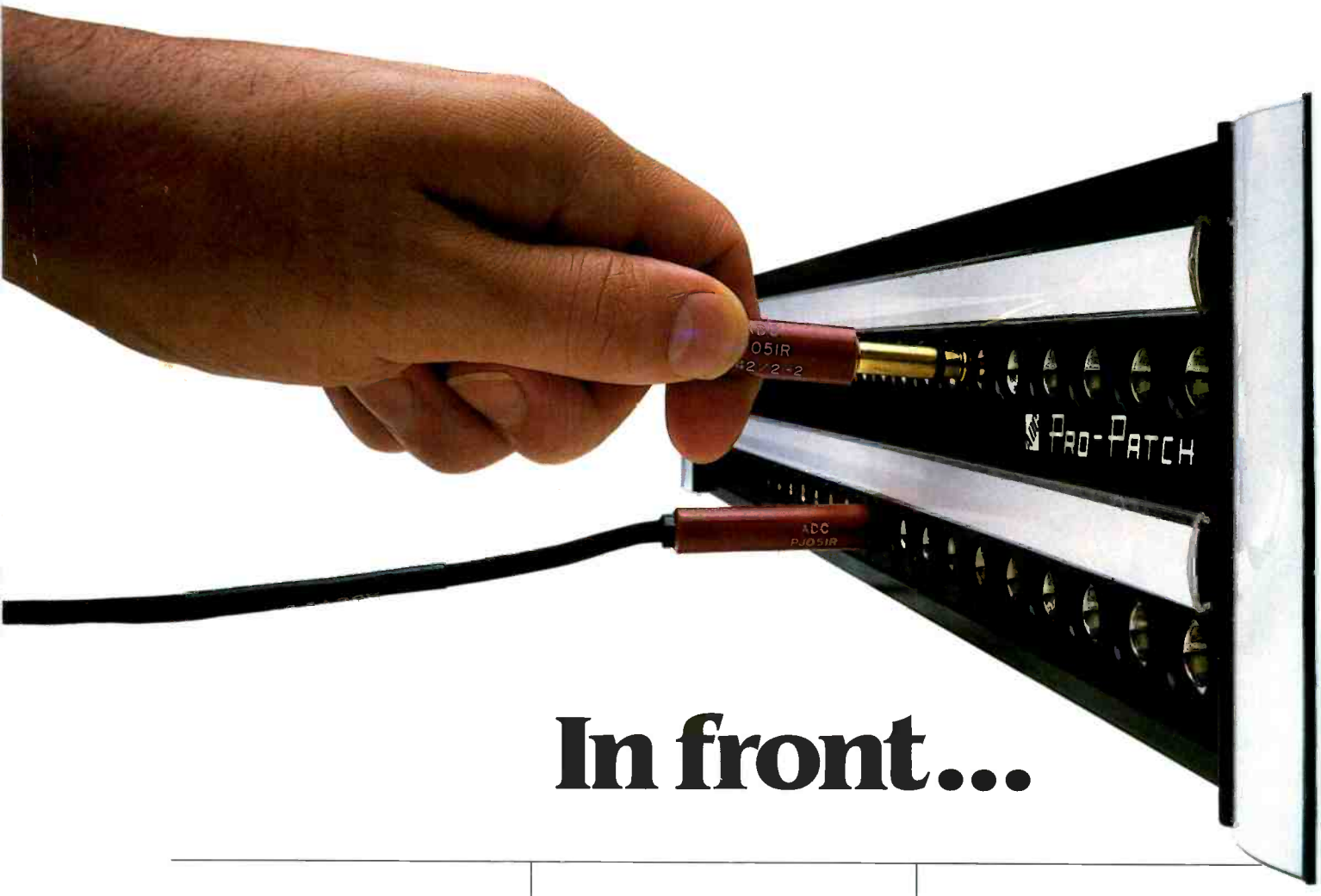
### Manufacturer support

The stations considered various microwave gear from a number of manufacturers. Aside from supplying the hardware, they needed engineering assistance from the manufacturer. They decided that one supplier should provide all the equipment because the network was a total system. This approach proved correct.

According to Bob King, engineering manager at WFMY in Greensboro, where the heart of the system is located, "We needed to put it in place

*Continued on page 116*

# PRE-WIRED JACKFIELDS

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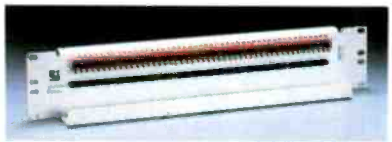
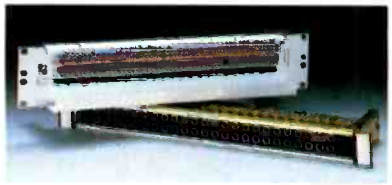
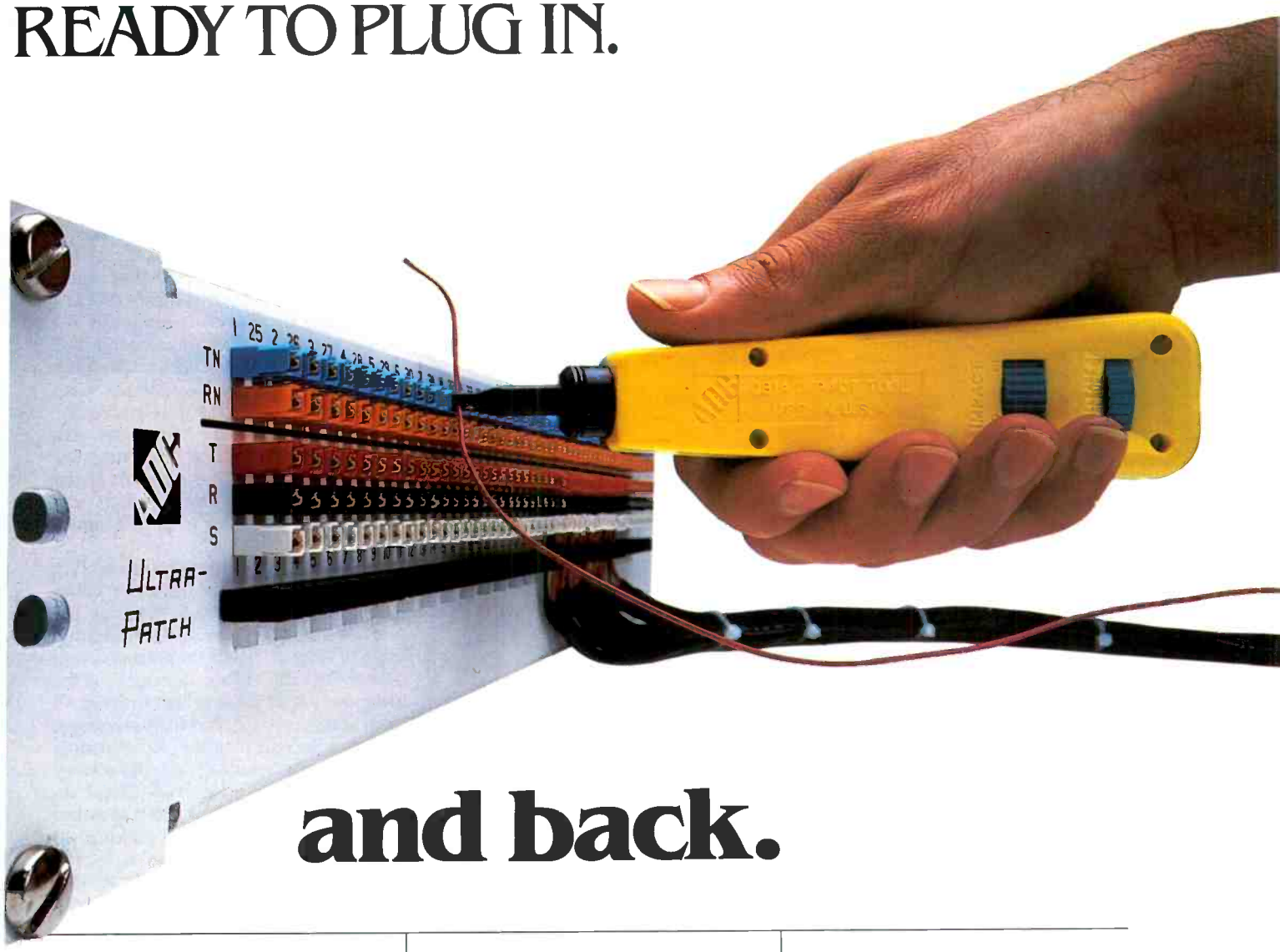




# READY TO PLUG IN.

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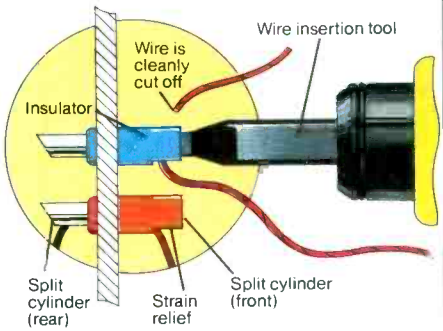


*ADC's unique split-cylinder system features contacts that will accept 22,24 or 26 AWG solid or stranded wires. The cylinders are housed in plastic insulating modules and are recessed to virtually eliminate shorting at the contacts. Both sides of the contact have two-wire capability providing for four gas-tight terminations per contact. The cylinders are also rated for a minimum 100 cycles and are easily replaceable. Triple strain relieving is provided on all units.*

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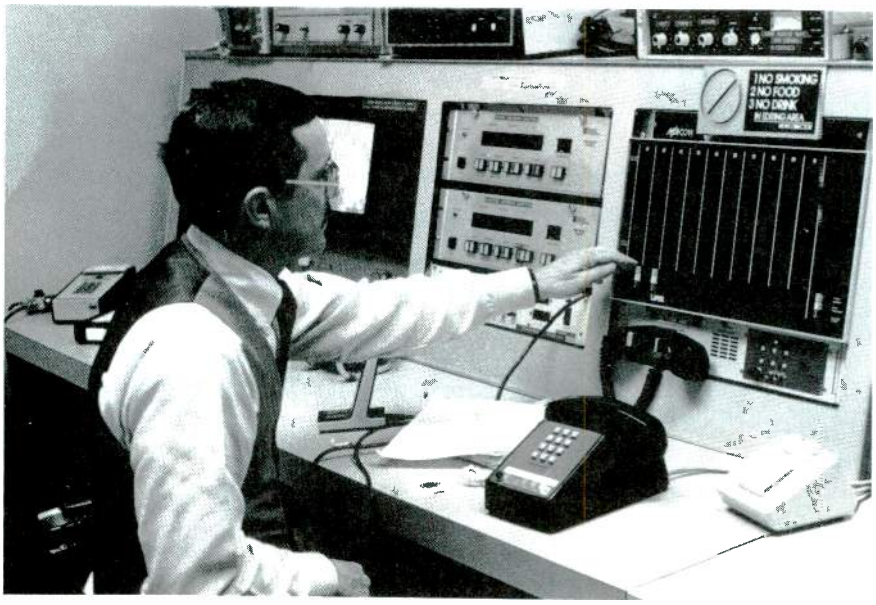
*Continued from page 113*

and, once it was operational, not worry about it. We had a few 'birthing pains,' but we expected that with an idea this new."

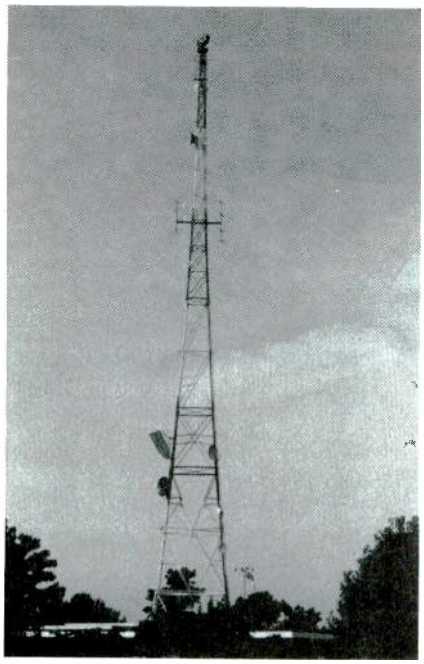
M/A-COM, the manufacturer selected, was instrumental in design of the system, taking part from the beginning and laying much of the groundwork for the network. Because the concept was so new, this design input was critical.

As Ted Lester, WRAL engineering manager, said, "Because there were various distances involved, we needed someone with a lot of RF experience. They gave us the 'yes, it will—no, it won't' information we needed to make the news network operational."

One of the keys to the system proved to be WFMY's 1941-foot tower located in Randolph County, NC. The tower was built with plans to carry two TV stations and two FM stations. To put one M/A-COM 2GHz system and one 2.5GHz system on the tower, WFMY had to forgo one FM antenna. Frequencies for the network were selected by juggling the existing microwave channels in the area to come up with the right combination to get the required separation. RF interference studies were performed to ensure that equipment for the Carolina News Network would not interfere with other existing bands. Although the process became involved, everyone agreed that the efforts were worth the time spent.




Bob King, WFMY engineering manager, is shown in the Carolina News Network master control room.



WRAL tower in Raleigh, NC, where WWAY is switched.

The two microwave transmitters and receivers are mounted on a transition platform on the tower 1575 feet in the air. Most of the system control is done using subcarriers. Each station controls what it wants to receive from the tower. Using three independent systems (M/A-COM "G-LINE" equipment on the 2GHz, 2.5GHz and 7GHz bands), the stations are capable of providing their viewers with live stories and tapes instantaneously and simultaneously from the North Carolina mountains to the coast. WWAY is switched through WRAL via a 2-way 7GHz feed, and the other stations have direct 2-way feeds to WFMY using the 2GHz and 2.5GHz bands.

**Productivity increases**

By employing this microwave system, the Carolina News Network has extended all four stations' news coverage capabilities tremendously, and has improved the overall quality of coverage for viewers throughout the state. The key to the network's success is that each station involved is capable of giving its viewers greater presence and more up-to-the-minute coverage.

WRAL feeds the other stations heavily because it is located in the capital city of North Carolina. Al Hinman, managing editor of the news department at WFMY, said that they can offer news from the capital through WRAL without having to send a crew, or relying on tapes shipped by bus or plane. Not only are these former methods expensive, but they have never been totally satisfactory. WFMY is capable of doing the same for the other stations. "It's just tremendous," Hinman said. "For example, when fire broke out in a transformer at North Carolina A&T State University, WFMY was first on the scene. We broadcast live and fed the other stations live reports and tapes over the news network. All four stations had in-depth coverage for their next newscast."

WSOC regularly transmits news live to the other stations from the Charlotte Motor Speedway. Without the network, this news would be outdated by the time it could be gathered and aired by the other stations. This cooperative approach has allowed all four stations to expand their coverage, not only in volume, but also in scope. For example, when WRAL did a story on biocides, a chemical threat to streams and creeks, the other member stations were capable of picking up the story, expanding upon it locally and telling their viewers how this threat was affecting them and why they should be concerned. The stations are finding that the microwave link can be used not only for on-the-spot news, but for trend stories and perspective pieces.

Greg Stone, WSOC general manager, said, "It's been a real boon to us in terms of Carolina coverage. Now we have stories that are very timely and have been well-developed, that very day, by another station in another part of the state. It has added a whole new dimension for us."

Perhaps one of the most dramatic uses WSOC has made of the system occurred early last summer. When a child was lost on Roan Mountain, deep in the Blue Ridge Mountains, interest was statewide. WSOC sent its helicopter to the mountains to cover the search and to feed stories back daily via microwave to the studio. The other stations received live feeds just before news time and gave up-to-the-minute progress reports on the search. Without the network, this would have been impossible.

Since WWAY joined the network,

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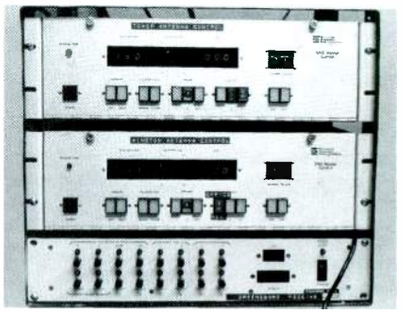
WRAL, WFMY and WSOC have been capable of offering live coverage from the NC coast. This had proved impossible in the past because of the expense and time involved in sending news crews to the coast. Because of the many events that occur in that area during the summer, the member stations expect to feed heavily from WWAY during that season.

Recently, WWAY had occasion to use its new microwave link in another way. George Diab, president of Clay Broadcasting, said, "WRAL in Raleigh was getting a poor network feed from New York. We picked up the program signal on our satellite dish and fed it back to Raleigh over the news network. We wouldn't have been able to do that before."

### Easy operation

From an operational standpoint, the system is simple. All a member station must do to receive a live or taped transmission from another member is to call in a request. The requested item is sent immediately. Because the system is always in operation, any station can send or receive stories continuously over the M/A-COM links. And being so easy to do, the stations use the service on a routine basis.

This new accessibility of up-to-the-minute news programming from the major parts of the state has greatly enhanced and expanded each station's newscasts. They think they have only begun to scratch the surface of possibilities offered by this network, available to all four stations 24 hours a day, seven days a week.



WFMY tower antenna control system in the master control room.

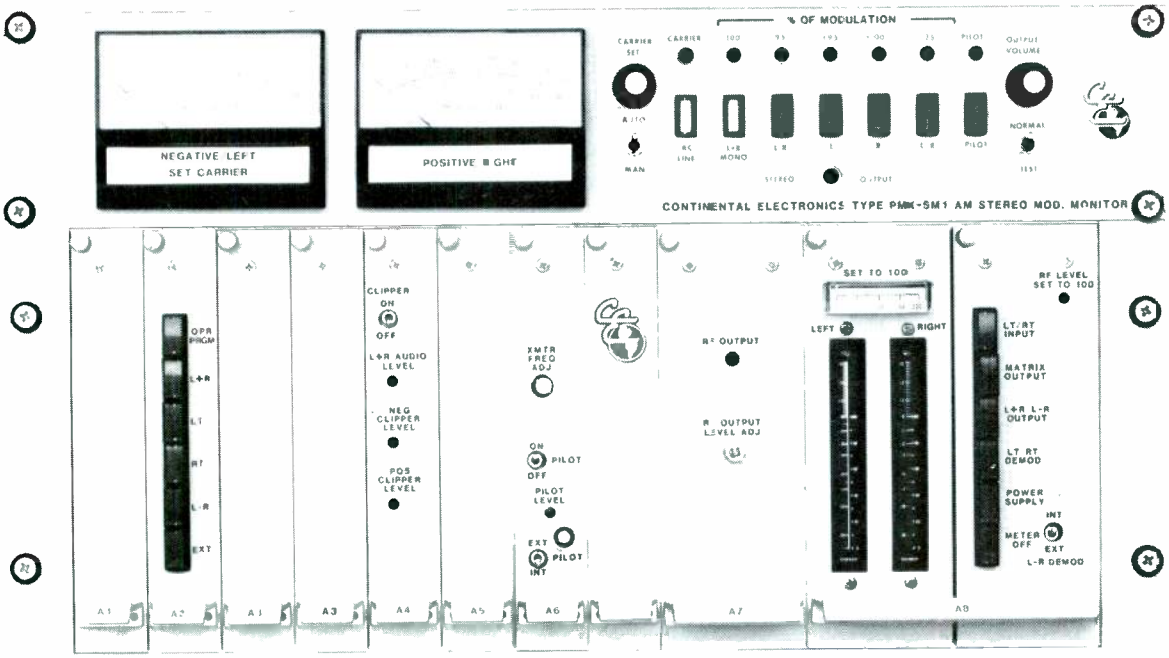
So far, the member stations have used the microwave link primarily for newsgathering, but they are beginning to explore other areas. WRAL has launched a new weekly sports program that airs at 11:30 p.m. every Saturday. Because *Action Sports Saturday* draws on game video from other parts of the state, WRAL has been capable of providing sports enthusiasts a comprehensive weekly sports program based on sharing video with other markets.

John Green, WRAL general manager, thinks that the implications of the Carolina News Network are long-range and encompass much more than news and sports programming. "For commercial stations in a competitive market to stay alive, I think we're going to have to do more and more informational programming," he said. "That's what separates us from other stations. This cooperative microwave link gives us the opportunity to do that." Green said that the real potential is yet to come, because the electronic link holds tremendous capabilities in entertainment, sports and public affairs programming. "At this time we are using 1% of the potential this system holds for us," he said. "We have plans to try a lot of things this year."

As Jim Hefner, WRAL news director, said, "We're very proud of the Carolina News Network, both as independent stations and as a group of TV stations working together. And, we haven't even started to use the full capabilities yet. There's a lot to learn. We're the pioneers."

All those involved in the four news departments are excited with the potential of the network. Ron Price, WRAL assistant news director, summed it up by saying, "We think it's the wave of the future in terms of local television."

# Your winning combination for AM Stereo




**Is AM Stereo ready to move up?**

Market-place decisions notwithstanding, the recent introduction of receivers able to decode signals from any of the four systems in use today makes it easier for broadcasters to move ahead with AM Stereo plans.

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Recam was also selected by ABC

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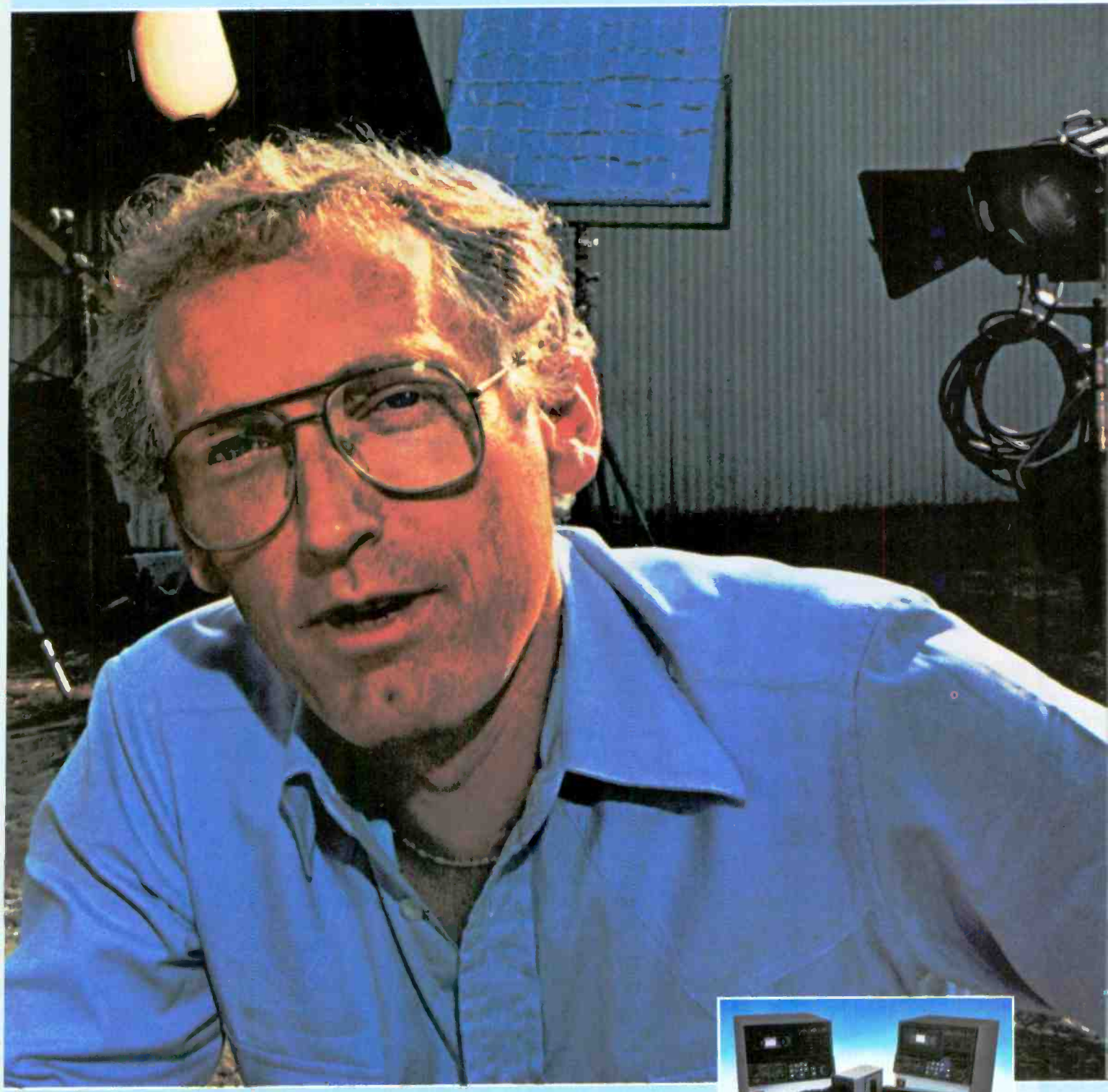
Joe Camp, *Creator of Benji.*



Sports to record their momentous ascent of Mt. Everest for "The American Sportsman." And by the producers of the epic science-fiction film "Dune" to record "The Making of Dune" for TV broadcast in 1984.

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# Three ways to greater energy efficiency

By Dan Hansen, Waupaca, WI

Over the last decade, the efficient use of energy has become a vital concern of nearly everyone, especially US radio broadcasters. With escalating oil, gas and electricity prices, station owners and general managers have seen their monthly utility bills soar. However, Edward Kramer, owner/manager of WPDR-AM/WDDC-FM in Portage, WI, has been able to double the efficiency of those important energy dollars, and minimize the impact of spiraling energy costs.

Kramer, who acquired the Portage stations in 1974, soon found himself facing a familiar problem: His operation had outgrown the size of the old 900-square-foot building he had inherited. In 1977, when the decision was made to build a new 2000-square-foot structure next door, to house the stations' offices, studios and transmitters, energy conservation was a prime consideration.

Working with Don Klabunde, of Don's Electric in Portage, WI, a unique approach to energy efficiency was developed. It revolved around a 3-component system using the AM and FM transmitters, a heat pump and an active solar collection system to maintain the proper interior climate control.

Klabunde's company installed the stations' heating and cooling equipment and custom-designed a Honeywell control unit, which is the heart of the entire system. Using a minicomputer, the control system activitates the three major components, as needed, for maximum energy efficiency.

Although the solar collector panels are certainly the most visible, and the most intriguing elements of the system, the AM and FM transmitters are the most cost-effective elements in supplying heat to the building's offices and studios. The 1kW AM transmitter, which operates from 6 a.m. to sunset, and the 3kW FM transmitter, in operation 24 hours a day, use special ductwork and a series of motor-controlled dampers to channel their heat through the building's forced-air ducts, or directly outside after the desired 68° to 70° maximum temperature has been reached.

During cold weather periods, when the transmitters are unable to produce sufficient heat, the master control unit, which senses regular wall thermostat readings, automatically activates the solar storage system. There are eight solar collector panels on cement blocks adjacent to the former studio/office building, now used for storage. The old building also houses the system's twin 275-gallon insulated hot water storage tanks. A hot water coil is connected to the new building's forced-air system and a small pump circulates the water when heat is called for.

This particular active solar system was designed strictly as a limited-use source of heat for only

# A LINE OF SOPHISTICATED MASTER CONTROL SWITCHERS

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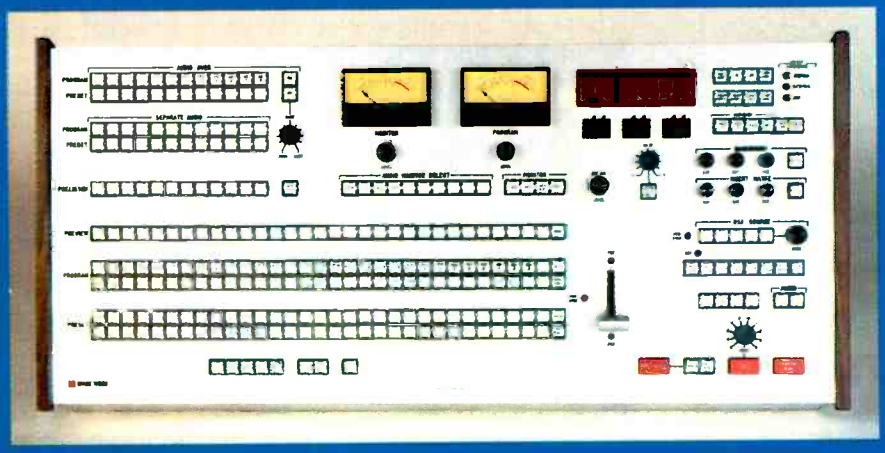

### MODEL 8200 MASTER CONTROL SWITCHER

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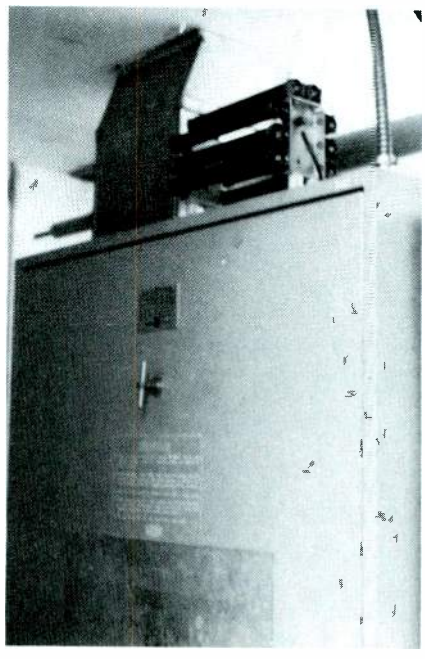
a few hours per day. Klabunde cautions that despite recent advances in technology, active solar energy systems remain feasible solely as secondary sources of heat for Wisconsin and similar climates. He calculates that to supply even 25% of the Portage stations' heating requirements during a normal season, a solar collection system four to five times larger would be needed. In many southern and western states, however, an active solar system could prove a considerably more practical source of heat.

In extremely cold weather, when even the transmitters and solar collectors are not able to maintain the desired temperature, a heat pump with back-up electric furnace is activated. Not only is the heat pump an efficient source of heat, it is also a highly efficient air conditioner.

Klabunde describes the heat pump as "an automatic environmental control system that will switch from heating to cooling as needed." A pair of coils in the refrigeration system, and a reversing valve, enable the heat pump to function as either a furnace or air conditioner. When heat is called for, the reversing valve makes the outside coil the cold coil and the inside coil the hot one; for cooling, the reversing valve switches the inside coil to cold and the outside coil to hot, using the outside air to facilitate both functions.



Air ducting channels transmitter heat through building.

The initial cost of such a multicomponent heating/cooling system is greater than a conventional furnace and air conditioner. According to the best estimates of both Kramer and Klabunde, the additional cost would be approximately 30%. The big savings results from a substantially lower operating cost over the life of the system.

Kramer calculates the payback time for his WPDR/WDDC energy system as two years. This relatively short payback time is due primarily to the use of the heat generated by the broadcast transmitters. Kramer admits that his bill for just the electricity used during that first winter in the new building was actually less than in the old one. Through increased efficiency, less electricity was needed for a building about twice as large. And most of the cost of the fuel oil used to heat the old building was also eliminated.

It's not really necessary to employ the most exotic or expensive methods or equipment in order to increase a station's energy efficiency. In fact, there are several relatively inexpensive ways to conserve energy.

### Some other suggestions

If you are fortunate enough to have the offices, studios and transmitters—or even the studios and transmitters—under the same roof, proper regulation of the transmitter heat could be an important first step. Simply channeling the transmitter heat through the building during the winter, and venting the excess heat outside in summer, could result in a considerable reduction of heating and cooling costs, using your present equipment.

Also consider increasing ceiling insulation to an R-factor of about 30 to 40 along with the installation of double or triple pane windows. These items, as well as caulking

# The Studer for Tomorrow's Teleproduction

## Introducing the A810 stereo recorder with center track SMPTE code...from Studer, the world leader in audio recording equipment.

### Stereo + SMPTE Code on ¼" Tape

This is the one recorder made to meet your demand for better quality stereo audio for video productions. With a Studer A810 you can produce state-of-the-art audio tracks, then use any SMPTE-based synchronizing/editing system to lock the A810 to your VTR's.

You don't need a 4-track recorder. You don't need ½" tape. And you don't have to program offsets into your synchronizer.

It's all possible because the A810's optional center-track SMPTE code system uses a separate set of code heads, working in conjunction with a microprocessor controlled digital delay. The separate heads assure code-to-audio crosstalk rejection of better than 90 dB. And the digital delay automatically compensates for the tape travel time between code and audio heads at all four tape speeds.

### Total Microprocessor Control

The on-board CPU controls all A810 transport functions, all audio status switching, and all audio parameter settings. Design flexibility lets you program the A810 to do what you want it to do. A zero locate and one autolocate position are fixed, but three additional "soft keys" may be programmed for a variety of functions, including up to three more locate positions and two different edit modes. All audio parameters (bias, level, EQ) are set digitally and stored in memory, with memory storage for two different formulations at all four speeds. After initial set-up, you can switch to your alternate tape simply by pushing a button.

### External Computer Control

With the optional serial interface, you can control all transport and audio functions with your personal computer (RS232) or with any device conforming to the forthcoming EBU/SMPTE standard (RS422 modified).

### Studer Performance and Reliability

Using all-new electronics with advanced phase compensation circuits, the A810 delivers audio performance that is – compared to most other recorders – just short of phenomenal. And, as with all Studer products, the A810 is made from solid components and assembled with Swiss precision.

Get your production room ready for tomorrow's stereo audio. Call today for the location of your nearest Studer dealer.

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and weather stripping, will provide maximum increases in energy efficiency, at minimum cost.

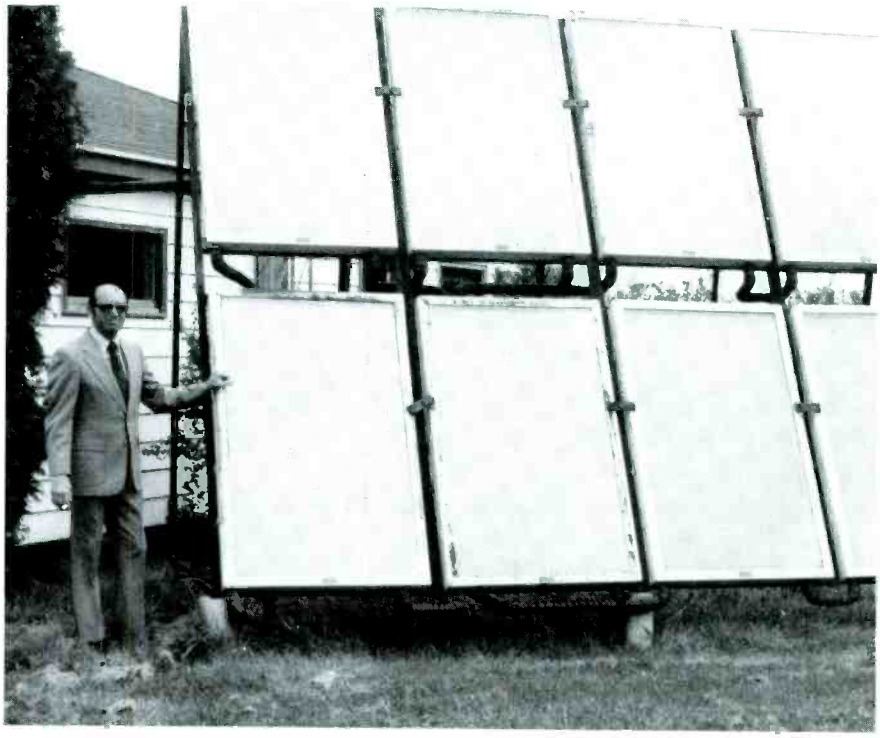
If staff and equipment have outgrown your current facility, and you've decided to remodel the existing structure, or build a new one, then energy-savings measures in addition to those listed above may be worthwhile.

You could simply replace your old furnace and air conditioner with a new, smaller, more efficient model, using the same fuel. Or you may find it advantageous to take the opportunity to convert to a single source of energy. One station used an oil furnace for heating most of the building, a gas heating system for another, and an outdated gas air conditioner. They recently modernized, installed a single, more efficient natural gas furnace, plus a smaller and more efficient gas air conditioner.

In the long run, however, your best bet may be to use a multielement system for heating and cooling such as the one in use at WPDR/WDDC. If possible, try to take advantage of the heat normally generated by the transmitter. For outstanding efficiency at both heating and cooling, the heat pump remains an excellent choice. Don't overlook the possibilities of solar energy.

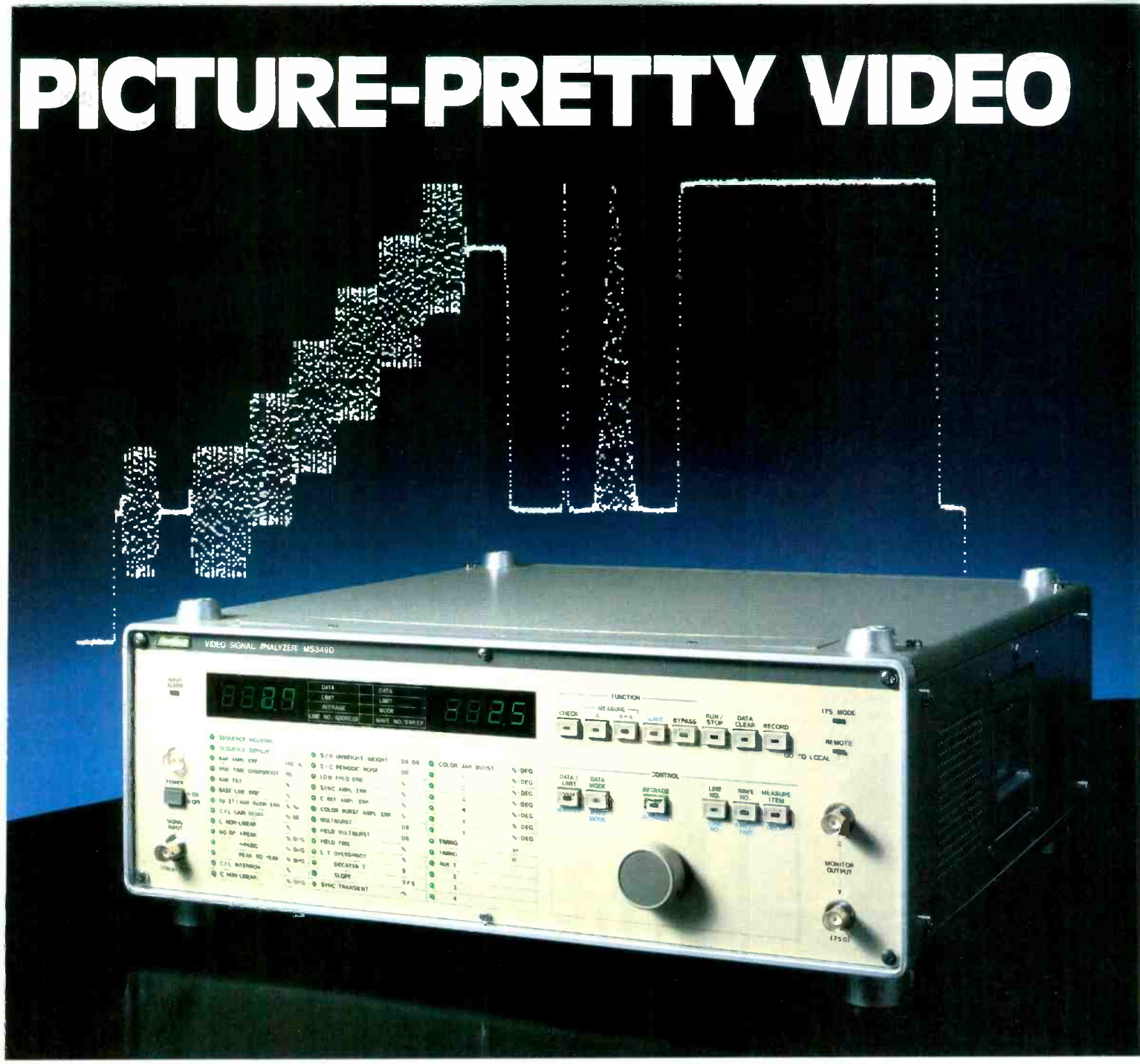
Although you may find an active solar collection system prohibitively expensive in your area at the present time, proper planning now during construction or remodeling could put you in a better position to take advantage of future advances in active solar technology. From an economic standpoint, passive solar energy currently is even more attractive than an active system. A little extra planning and investment can pay big dividends in energy efficiency. For example, southern windows will let in needed heat from the winter sun, while a longer roof overhang will help shade the rooms from the higher summer sun.

Your local electric utility company can be an invaluable source of help in planning and implementing energy-saving measures. Most companies will gladly perform an energy audit of your building, quickly pinpointing



Ed Kramer, owner/manager of WPDR/WDDC, shown with solar collector panels.

# PICTURE-PRETTY VIDEO




**Anritsu's Video Signal Analyzer**

Here's the economical new Video Signal Analyzer that's making everyone from broadcast engineers to maintenance technicians sit up and take notice. This compact instrument can analyze over 40 different CCIR- and FCC-recommended test signals.

**At the studio or in the field**

The Video Signal Analyzer MS349D is ideal for monitoring signals from pickup locations or in the broadcast studio. It features direct digital readings of waveform distortion and S/N ratio, allows comparison of measured data to preset limits, and even has a 10ns resolution wave memory for tracking down those elusive ghosts.

**Along the transmission line**

The Video Signal Analyzer can be used for measurements along all kinds of transmission lines: satellite links; terrestrial microwave lines; submarine cable, CATV and industrial TV systems; even optical transmission links. A GPIB interface helps make it ideal for unattended far-end monitoring.

**Part of a great team, too**

The addition of the sophisticated Anritsu MG311 Signal Generator turns the MS349D into an analyzer system for complete end-to-end video measurements. And when a printer is added, the MS349D can reproduce both measured data and the actual video signal, to make sure your video is always looking good.

To see for yourself just how pretty video can be, contact your Anritsu representative.

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problem areas, and offering advice on cost-effective solutions. Many utility companies are also involved in testing various alternate sources of energy. Some may even provide you with part of the equipment for such a project that allows them to monitor the system and gather research data. You might even be in line for lower electric rates when using renewable or alternate energy sources.

### Tax credits

Congress has also provided tax incentives to encourage energy conservation and the development of alternate energy sources. Tax credits are available for adding insulation and other energy-saving materials to existing buildings, plus there are tax credits for expenditures involving renewable energy sources in new construction as well as present structures.

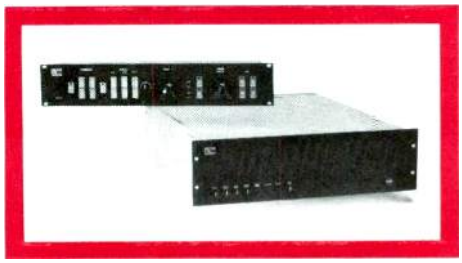
Several states offer similar energy tax credits, which could result in additional savings for you. Check first with the nearest office of the IRS and the state tax department or your own tax advisor to be certain as to exactly which expenditures qualify for tax credits.

With the increased energy costs we've seen over the last 10 years, coupled with projected future price increases, virtually every broadcaster will need to make the efficient use of energy an integral part of his present and long-range operating plans in order to remain competitive. A thoughtful, comprehensive approach—using a modern, multielement system—has helped Kramer nearly double his energy efficiency.

Matching modern, energy-saving technology to your station's present needs and future goals can help you achieve increased energy efficiency and the increased profits that come with it.

# Can your budget SQUEEZE

## A quality video image compression system into the picture?



## The SQUEEZER from Precision Echo fits into your picture!

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**The SQUEEZER: Your affordable alternative is pictured right here.**

In today's vast universe of production applications – the newsroom, mobile production units, post production, basic special effects – The **SQUEEZER,** at under $20,000, is the Price/Performance Champion of cost effective video compression.

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## Editorial

*Continued from page 10*

> *will help us move into the future... given the competitive pressures of the international market. But, however much we need standards for equipment...we also need to put thought and energy into standards of expectations and efficiency."*
>
> Julius Barnathan
> President
> Broadcast Operations
> and Engineering
> American Broadcasting Company
> SMPTE address, Oct. 31, 1983

In our December 1983 issue, Joseph Flaherty, vice president, Engineering and Development, CBS Television, devoted a paper to "TV Standards—Whither or Whether." He pointed out that 1983 saw two significant advances. First was the formation of an industrywide standardization effort (under the Advanced Television Standards Committee of the JCIC) to explore the need for, and to coordinate voluntary technical standards for, advanced TV systems in improved NTSC, enhanced 525-line systems and in HDTV. The second was the first worldwide TV standard, the world-compatible standard for digital coding of TV signals.

As Flaherty said, "The ATSC may be this nation's last chance to self-determine its future TV systems and to retain the technical leadership it has so long enjoyed." He followed with a plea for action by the EIA, IEEE, NAB, NCTA and SMPTE—working through the JCIC—to undertake an immediate and intensive review of existing TV standards, with a suggested course of action to follow.

In this endeavor, time is our enemy. As Flaherty observed, should we fail to initiate the leadership to develop an efficient, orderly and responsive standards organization in this country, we shall surrender control of our technological future to others.

Thus, 1984 may be a crucial year for the United States to further its interest in the development of standards. **BE** urges all who are concerned about your broadcast future to weigh the alternatives and to pledge support to the working groups that need your help and cooperation. A coordinated effort by all is needed if we are to take charge of history and guide the future course of broadcasting in the directions that best suit our interests and needs.

# business

### CORPORATE DATA

**Adams-Russell Company Video Information Systems Division** has announced the signing of an agreement with **Colony Communications,** Providence, RI, covering the purchase of an ARVIS-7000 system for automating functions associated with the sales and administration of local and regional CATV advertising.

**Altec Corporation,** Anaheim, CA, has voluntarily requested court protection while it undergoes reorganization under Chapter 11 of the Bankruptcy Code. This step became necessary because of the burdens imposed by the company's subordinated debentures and preferred stock. However, Altec plans to continue supplying acoustic and electronics products to its customer base.

James L. DeStefano, executive vice president of **EMCEE Broadcast Products,** White Haven, PA, and Dennis Atha, president of **Delta-Benco-Cascade,** Rexdale, Ontario, Canada, have announced the signing of an agreement to represent each other's line of translators and other LPTV transmitters, in their respective countries.

The **Mutual Broadcasting System,** Arlington, VA, has entered into a 3-year agreement with **GEO/SAT COMM** for full-time uplinking capabilities in Houston. GEO/SAT COMM, a subsidiary of SBS/GeoSource Communications, will service Mutual's multicasting channels aboard Westar IV, transponders 1D and 2D, from its fully computerized uplink facility, which has been used extensively for private networking and oil-field communications.

**Continental Electronics Mfg. Company,** Dallas, has signed a sharing agreement with **NAP Consumer Electronics Corporation,** Knoxville, TN, to manufacture and market the Magnavox PMX AM stereo equipment needed by AM radio stations to transmit stereo programming.

**Comtech Data Corporation,** Syossett, NY, has announced the appointment of **Allied Broadcast Equipment** as national distributor for its line of satellite audio terminal equipment.

**Agfa-Gevaert's Magnetic Tape Division,** Teterboro, NJ, has recently added **Burlington Audio Tape** to its authorized audio dealers responsible for marketing AGFA studio mastering tape on Long Island.

### NEW ADDRESSES, DIVISIONS

**National Semiconductor Corporation** announced construction of a 125,000-square-foot research and development facility adjacent to its corporate headquarters at 2900 Semiconductor Drive, Santa Clara, CA 95051.

Establishment of a new products division that will be responsible for planning, developing and entering new electronic markets was announced recently by **RCA.** The new division will be headquartered at the company's plant in Lancaster, PA. It will include the corporation's present electro-optics and systems activities, which are situated in Lancaster; Somerville, NJ; and Montreal, Canada.

**California Microwave** recently announced that its subsidiary, **Satellite Transmission Systems,** dedicated its new 60,000-square-foot plant at 125 Kennedy Drive, Hauppauge, NY.

**Tannoy Products Ltd.** recently moved to a larger office. The new address is Beadman St., West Norwood, London SE27 OPW; and the telephone number is 01-670-1131.

**Dearborn Wire & Cable Company** recently opened a new branch sales office and warehouse at 14182 Central Ave., Chino, CA. The phone number is 714-591-9393.

**Magnum Microwave's** marketing and sales department has moved into a new 7000-square-foot facility. The company's mailing address remains the same: 365 Ravendale Drive, Mountain View, CA 94043.

Riviera Capital Corporation has established a special division, **Riviera Broadcast Leasing,** which will be dedicated exclusively to servicing the special needs and requirements of the broadcast industry. The new division will be operating out of Riviera's newest branch office in Encino, CA, and out of the Huntington Beach, CA, office.


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# new products

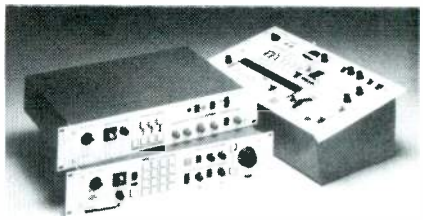
### SCPC audio input monitor

*Microdyne's* 1000-SCM series frequency modulates a baseband audio signal and provides an IF output for upconversion to the 5.925-6.425GHz band by a companion 1100TVE frequency-agile exciter. The standard 1000-SCM-40 has an input frequency range of 50Hz-7.5kHz. The 1000-SCM-200 input frequency range is 50Hz-15kHz. Both models provide a frequency-modulated fixed carrier in the 50-90MHz band for upconversion and transmission to a satellite using the SCPC radio system.

**Circle (305) on Reply Card**

### Production switcher system

*Sony Video Communications'* Director 2000 3-component system includes



the SEG-2000A special effects generator, the WEX-2000 wipe pattern extender and the CRK-2000 universal chroma-keyer. The SEG-2000A, capable of operating on ac or dc power, can be used in studio and field production. It is equipped with connections for up to six color cameras, one playback VTR, one camera for an external keyer and one camera for downstream keying using the built-in downstream keyer. The WEX-2000 extends the selection of the SEG-2000A to 84 wipe patterns. It also has memorization capabilities of up to three patterns. The CRK-2000 has dual outputs for composite video signals as well as a separate RGB input. Another feature is the natural chroma-key facility that creates natural shadows and softness on the compound key camera's picture.

**Circle (306) on Reply Card**

### Controller

*Microprobe Electronics'* Autonet controller automatically records network news and sports feeds each hour. It also automatically records feeds at a preset time each hour or by an external command from an automation system.

**Circle (307) on Reply Card**

### Volt-ohmmeter

The 3525 DIGI-PROBE from *Triplett Corporation* offers shirt-pocket size, internal overload protection and autoranging features. It uses large 5mm, easy-reading 3.5-digit LCD display with a Data Hold feature to facilitate measurements in low ambient light or confined areas.

**Circle (308) on Reply Card**

### U-matic videocassette

*Fuji Photo Film USA's* ¾-inch H521 BR features dropouts measured at no more than four per minute and a boosted video and color S/N ratio up to +2dB over the H521. Compared to the H521, video S/N and color S/N performance have been increased up to +2dB. Also, the H521 BR can remain in the stop-motion mode for as much as 180 minutes.

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# innovative 500

*because digital performance doesn't have to cost a lot . . .*


**The nova 500 Digital Time Base Corrector** defines a new industry standard. For the first time, digital performance doesn't have to cost a lot.

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8 bit 4X subcarrier sampling is employed for maximum picture fidelity. Advanced design memory provides 32 lines of video storage. Proven technology allows operation with less than 50 Watts of power dissipation.

All active components are temperature cycled, burned-in and tested PRIOR to assembly into the **nova 500**. Eash system is thoroughly burned-in after test for added reliability. Power supplies operate at no more than 55% of their rated capacity.

You compare! The **nova 500 Digital Time Base Corrector** . . . the best things do come in small packages!

For further information and pricing contact: **nova systems, inc.**
20 tower lane, avon, ct 06001
(203) 677-5252

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### Ultralight replacement headphones

*R-Columbia* ultralight headphones, weighing only 0.75 ounce, can replace any monaural or stereo headphone of the traditionally heavier types. The UL-85 headphone is available with or without mic boom attachments, and can be ordered terminated in standard or miniplugs.

Circle (309) on Reply Card

### Antenna steering system

A new antenna steering system is available for the *Magnatech* zero-offset polar mount. Quadrant steering features a rotary actuator to allow a continuous 130° arc. A hydraulic motor rotates the antenna at a uniform speed of 2.5°/s. The hydraulic drive used in the quadrant steering system may be stopped instantaneously, using a simple valve to achieve a repeatable positioning accuracy of more than 0.05°. A pressure relief bypass valve prevents overtravel damage to the actuator.

Circle (310) on Reply Card

### High resolution color monitor

The XM-1300 13-inch rack-mount professional monitor from *Sharp Electronics Corporation* may be used in studio or EFP. The monitor, with 0.31mm dot pitch, offers more than 600 lines of resolution at center screen. A front-panel control permits simple switching from notch filter to comb filter, which provides maximum resolution and minimizes cross-color interference.

Circle (312) on Reply Card

### Universal under monitor display

The *Image Video* 7707 is a 4-character alphanumeric display with on-air indicator. It is designed for source identification in conjunction with picture monitors. The system can be driven directly from Image Video routing or master control switchers or, with an optional RS-232 interface, can be driven from any routing or master control switcher that has a tally output. Display units are available in rack and wall mount.

Circle (313) on Reply Card

### VHF FM transmitters

The FBN-9000E series transmitters (10kW, 20kW and 40kW models) from *NEC America's Broadcast Equipment Division* are compact. The cabinet design (incorporating cooling air blower, HT transformer and harmonic filter) permits simple installation in an economically constructed transmitter room. The transmitters operate in a frequency band of 87.5-108MHz (programmable in 50kHz steps).

Circle (315) on Reply Card

### Chroma/phase display

A Chroma/Phase Display (CDPA) feature will now be included in all CTVM 3 Barco monitors and CD 3 chroma decoders from *Elector USA*. CDPA facilitates the correct adjustment of monitor phase and saturation controls. The feature does not require SMPTE color bars (only full-field color bars) and is activated by a button on the front panel.

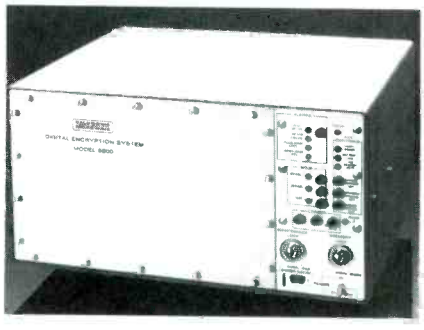
Circle (316) on Reply Card

### Video typewriter

*FOR-A Corporation of America's* VTW-600 features a preview function that allows new or just-received information to be set up on the preview monitor while data already programmed appears on the program monitor. It also permits addition of color to each character with choice of eight different colors (using the FOR-A color control unit—CU-600). An 8-page memory is standard, with up to eight lines per page and 32 characters per line.

Circle (317) on Reply Card

### Digital encryption system



*California Microwave's* CD5800 features an electronic keyloader, separate master and working keys, battery backup for key retention, up to 16 standby keys with automatic key change and down-line key management capabilities. Alarm reporting circuits allow access to 11 status alarm outputs. Maintenance assistance is provided by equipment self-diagnostics, system and local loop test modes and bypass operation.

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# SOUND. SCIENCE. SYNERGY.

When you see "JBL" on a speaker, sound system or our newly acquired partner UREI Electronic Products, you're looking at a great deal more than a company logo. You're looking at the synergy of science and sound. At the marriage of advanced scientific research and innovative application.

The science of sound and JBL have always been synonymous. Tools from laser holography to the computer to robotics are helping JBL bring new clarity, richness and authority to sound.

JBL research has produced the first perfected use of pure titanium in the audio industry, giving new ruggedness, dependability, and sound integrity to the compression driver diaphram. Our patented "diamond surround" diaphram has dramatically extended high frequency response.

We've harnessed computer science to make major advances in the design of JBL transducers and UREI audio electronics. And microprocessor-directed mechanical arms are flat-winding voice coils for even greater material density and efficiency.

Our quality control network remains the most comprehensive, most demanding in the industry. Every single part, component, and system is put through a rigorous, uncompromising battery of tests and inspections. At the end of each production phase, every product is graphed and compared against its exacting design goals. Finally, products move to Quality Assurance where they are life-cycle tested to insure pro-rugged dependability.


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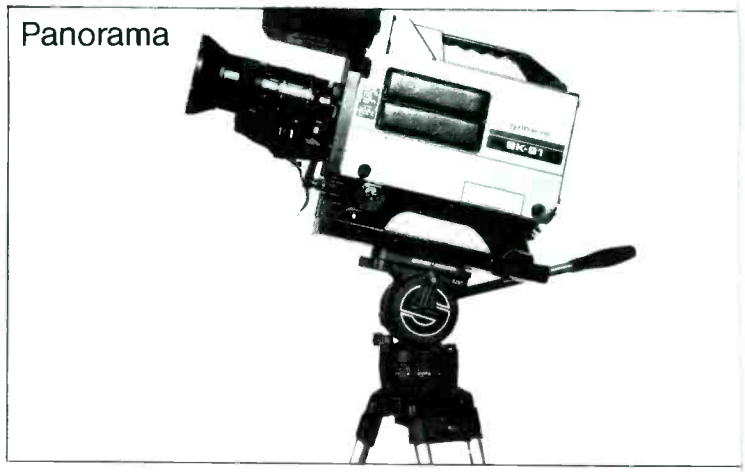
# sachtler

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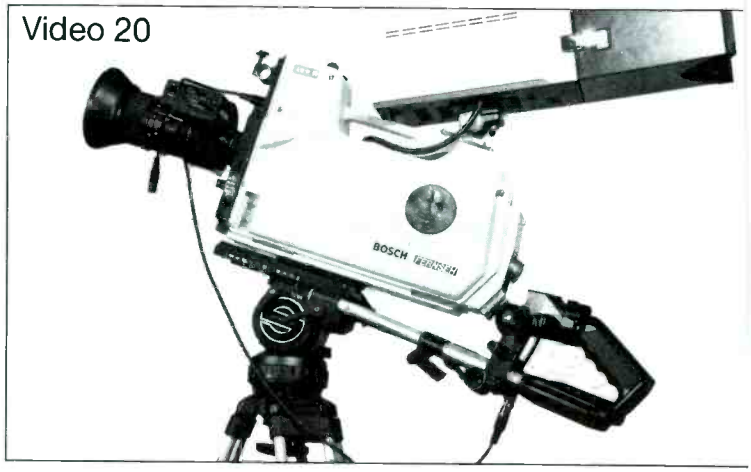


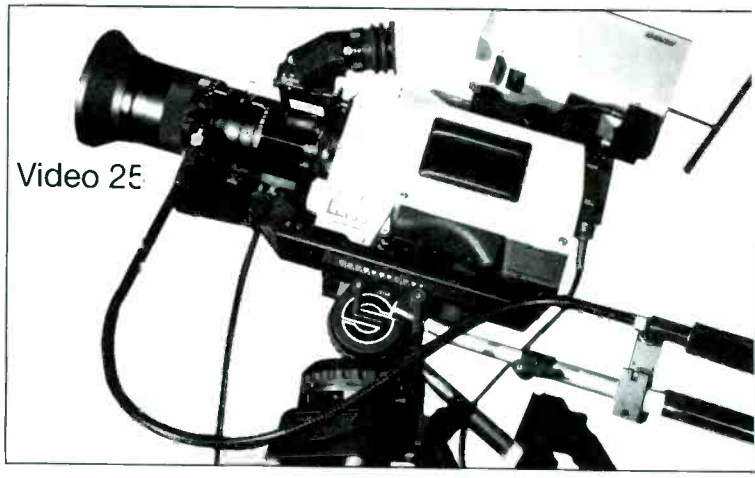


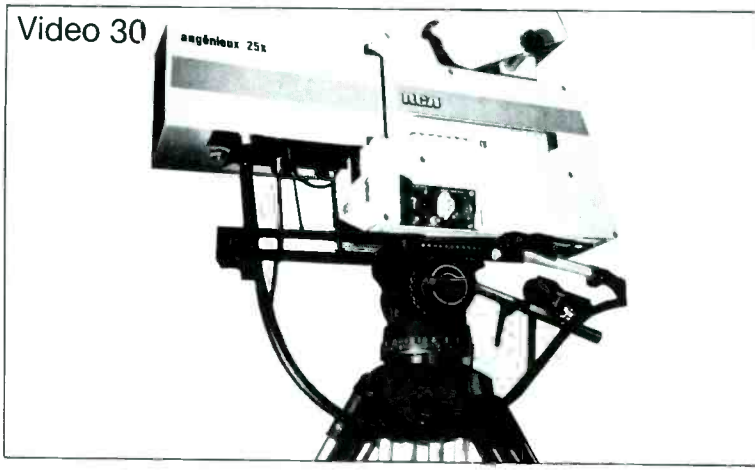

# people

Three new staff additions at the Cetec Antenna facilities in Sacramento, CA, have been made as a part of the company's continuing growth. They are: **William Borland** as controller, **Ali Mahnad** as antenna design engineer and **Edward Fitzgerald** as FM sales product manager.

Five new sales and marketing appointments have been announced by ADDA Corporation. **Bernard V. Munzelle** has been named Eastern regional distributor sales manager, a new position. Munzelle, who was formerly vice president of marketing for Hitachi Denshi America, Ltd., will handle the company's distributor activities in the New York area. **Timothy Stockhaus** has been named Western regional distributor sales manager. He was formerly product manager at Television Associates, Mountain View, CA. **Donald A. Carlsen** has been named Pacific regional manager and will be headquartered in Los Angeles. In his new assignment, he will be directing sales primarily to broadcast and production facilities in the southern California, southern Nevada, Arizona, Utah and New Mexico area. Carlsen succeeds **Sheila Holmes-Ross,** who has been named Northwest regional manager, a new direct sales region for ADDA, which includes Northern California, Oregon, Washington, Idaho, Montana and Northern Nevada. **James G. "Butch" Fadely** has been named Southeast regional manager and will be headquartered in Atlanta.

**Warren Trumbly** has been named sales engineer for Townsend Associates, and will be working out of the West Coast sales office in Sacramento, CA.

**Stephen G. Tom** has been named regional account manager for Bonneville Satellite Communications. Based at BSC's main southern California operations center in San Diego, Tom will develop sales and marketing programs covering the company's full range of satellite communication services.

**Frank Logan** has been named Western regional sales manager for Convergence Corporation, Logan formerly was employed by Wang Laboratories.

**Robert A. Lundeen** has joined Rees Associates, Architects, Planners, Engineers as vice president in charge of operations for the company's new Houston office.

Comtech Telecommunications Corporation has announced the appointment of **Walter J. Gordon** as president of its subsidiary, Comtech Microwave Corporation. As president, Gordon will have responsibility for the overall low noise amplifier operations and will be expanding the capabilities of Comtech Microwave into other associated product areas.

Data Communications Corporation, Broadcast Division, has announced the promotion of **Greg Calhoun** to the position of regional sales manager. He formerly held the position of assistant sales manager, Broadcast Division, and has been with DCC since 1976. **Doug Domergue** has been promoted to regional sales manager. He formerly held the position of area manager, New York, Broadcast Division, and has been with DCC since 1980.

**Allan J. Harding** has been elected vice president, finance, of Electronics, Missiles & Communications. Harding has been with EMCEE since November 1982, serving as director of finance.

# calendar

**Jan. 23-25**

The Hyatt Regency in New Orleans will be the site of *OFC-'84*, a topical meeting on optical fiber communication. Topics will range from basic research to hardware manufacture and systems development and applications. For more information, contact OFC-'84, c/o Optical Society of America, 1816 Jefferson Place, NW, Washington, DC 20036.

**Jan. 25-27**

Giants Stadium in East Rutherford, NJ, will be the site of the *Business Telecommunications Exposition*. For more information, contact Michael C.J. Houston, TEG, 9128 Columbia Ave., North Bergen, NJ 07047; 210-662-1318.

**Jan. 31-Feb. 2**

The *Communication Networks Conference and Exposition* will be held at the Washington Convention Center in Washington, DC. More than 100 sessions will be featured, along with more than 100 exhibitors. For registration information, contact Louise Myerow, Communication Networks, Box 880, 375 Cochituate Road, Framingham, MA 01701; 800-225-4698 or 617-879-0700.

**Feb. 9-14**

"The Road to the Future" will be the theme of the *21st Annual NATPE (National Association of TV Program Executives) International Conference* to be held at the Moscone Center in San Francisco. Two futurists, John Naisbitt and Robert Waterman, Jr., each with a best seller on the book lists for the past year, have been signed to make special presentations. Joan Rivers will headline the Iris Awards evening. For more information, contact NATPE, Suite 1205, 30 E. 42nd St., New York, NY 10017; 212-687-3484.

**Feb. 10-11**

The *18th Annual SMPTE TV Conference* will be held in the Queen Elizabeth Hotel in Montreal. For more information, contact the SMPTE, 862 Scarsdale Ave., Scarsdale, NY 10583.

**Feb. 10-14**

Moscone Center in San Francisco will be the site of *NATPE-'84* (National Association of Television Program Executives). For more information, contact NATPE, Suite 1205, 30 E. 42nd St., New York, NY 10017; 212-687-3484.

**March 6-8**

The *Armed Forces Communications and Electronics Association First Far East Conference and Exposition* will be held at the Plaza Hotel in Manila, Philippines. The conference will focus on the telecommunications, $C^3I$ (command, control, communications and intelligence), and communications and electronics requirements of Free World allies in the Pacific and Indian Ocean areas. For exhibit information, contact John Spargo & Associates, 5641 Burke Centre Parkway, Burke, VA 22015; 703-425-8590; telex 90-1114 AFCEA BURK.

**March 12-14**

The *Fifth Annual Fiber Optical Communications* short course will be offered by the Center for Professional Development of Arizona State University's College of Engineering and Applied Sciences. The course is designed for those entering the fiber-optics industry—systems and component designers, manufactur-

ing engineers, engineering managers, marketing managers, sales engineers, teachers, and others who require an understanding of optical waveguide communications. More information is available from the ASU Center for Professional Development at 602-965-1740.

**April 3-5**

The *International Teleconference Symposium (ITS)* will be held in five locations concurrently: Sydney, Australia; Tokyo; London; Toronto; and Philadelphia. These sites will be linked in selected combinations by teleconference connections (audio, video, graphics) during parts of each day. For more information, contact Conference Clearway Ltd., Conference House, 9 Pavilion Parade, Brighton BN2 1RA, United Kingdom.

**April 25-27**

*EDS-'84* will be held in the Las Vegas Hilton Hotel, Las Vegas, NV. For the first time in the convention's 47-year history, distributors are invited as exhibitors. For more information, contact Electronic Industry Show Corporation, 222 S. Riverside Plaza, Suite 1606, Chicago, IL 60606; 312-648-1140.

**April 29-May 2**

*NAB-'84* will be held in Las Vegas, NV. For more information, contact NAB, 1771 N. St., NW, Washington, DC 20036.

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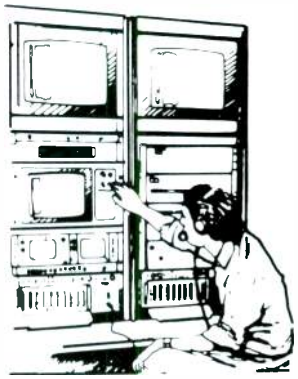

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