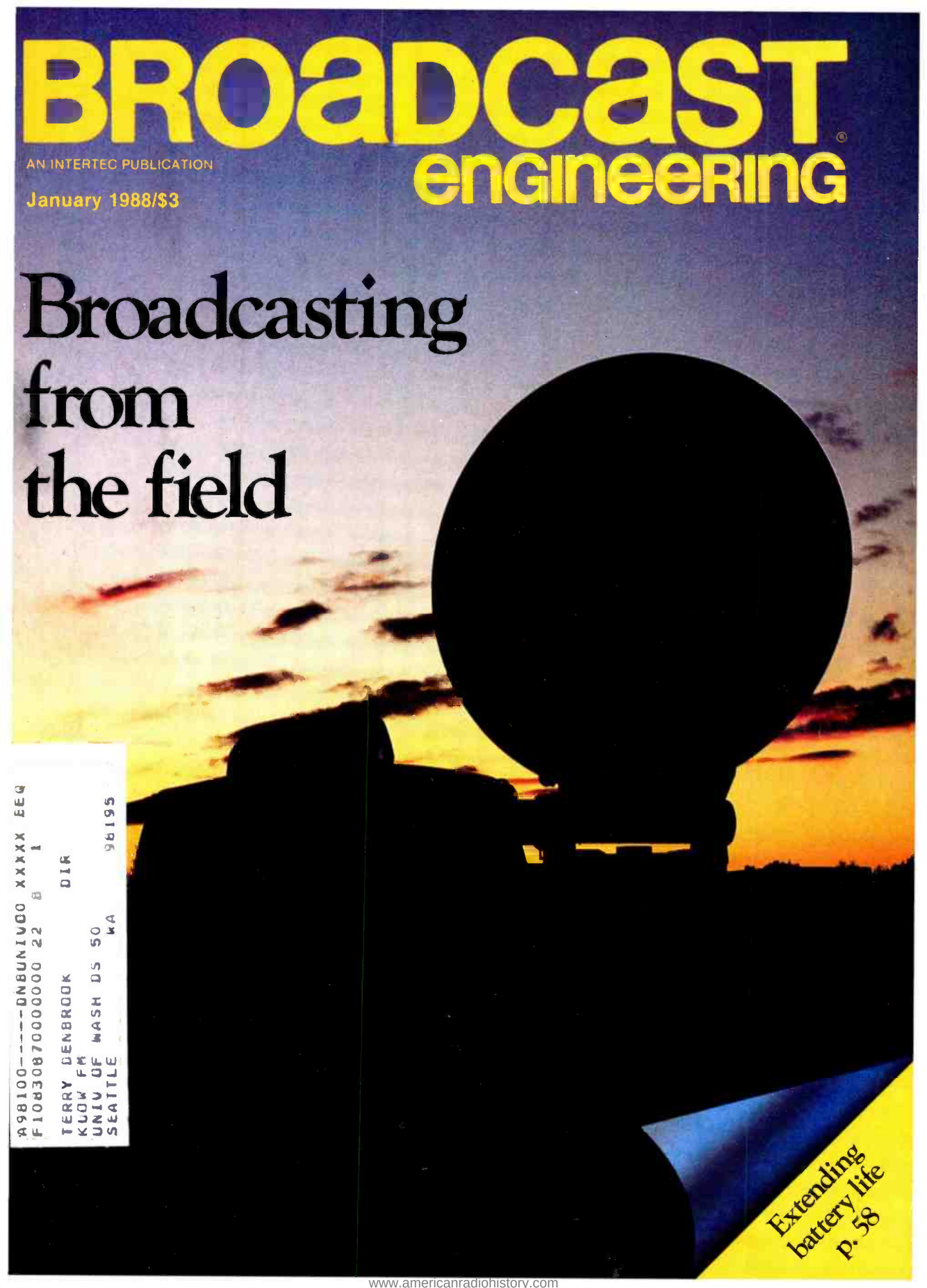
BROADCAST ENGINEERING

AN INTERTEC PUBLICATION

January 1988/$3

Broadcasting from the field



Extending battery life p. 58

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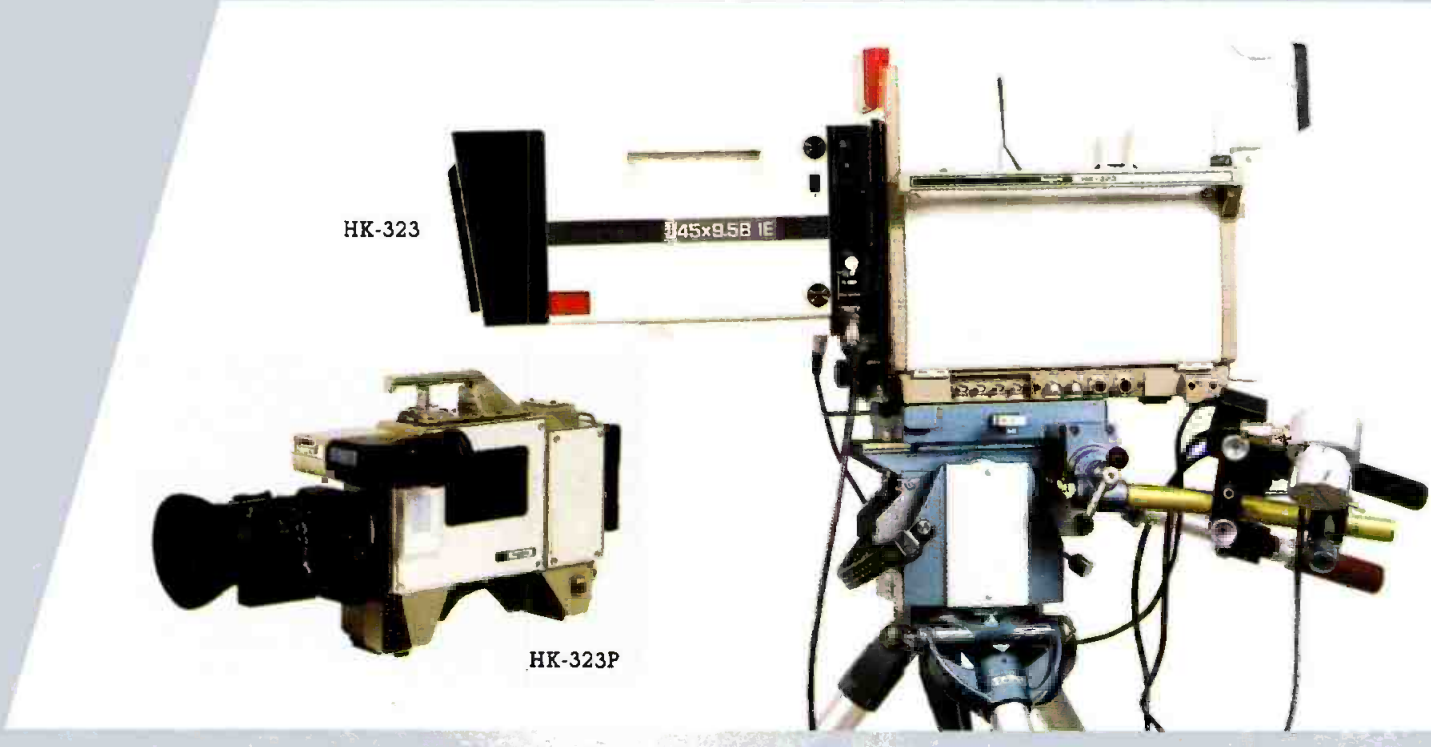

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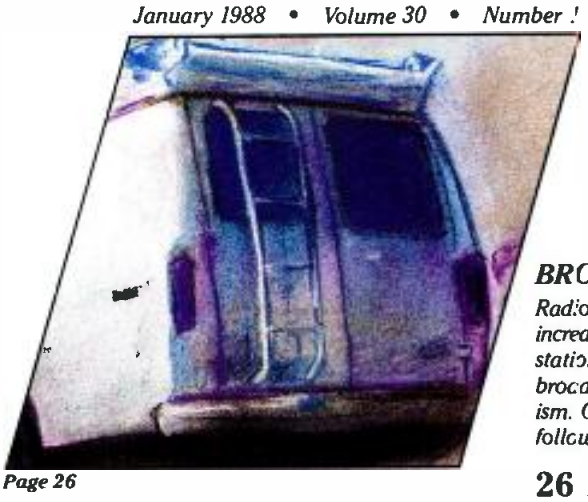

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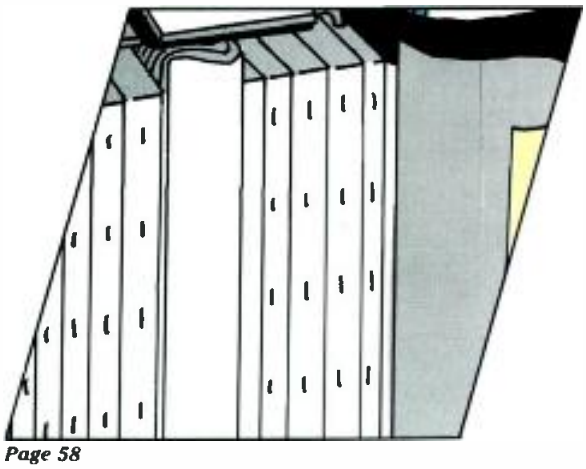

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BROADCAST engineering

BROADCASTING FROM THE FIELD:

Radio and TV stations are finding ENG, EFP and RENG operations increasingly important as they compete for audience shares with other stations and alternative audio and video program sources. Outside broadcast work provides stations a key competitive edge: localism. Our examination of broadcasting from the field includes the following articles:

OTHER FEATURES:

ON THE COVER

Satellite news vehicles (SNVs) have added a new dimension to outside broadcast work. SNV trucks, more than anything else, symbolize the desire of broadcasters to take to the road. (Shown is the Newsbreaker SNV. Photo courtesy of Centro.)

DEPARTMENTS

How to re-create instantly -- anytime -- the exact camera adjustments that gave you perfection today.

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1988 SBE call for papers

Abstracts are being accepted for proposed engineering papers for the 1988 **Broadcast Engineering** conference of the SBE national convention. The technical conference will address the hands-on needs of engineers and technical managers at radio and TV stations. The conference is being organized again this year by John Battison, well known through his work at the annual WOSU seminars.

If you would be interested in preparing a technical paper for presentation at the conference, submit an abstract outlining the scope of the paper, and its importance to the industry, to Battison no later than March 31. If you are interested in participating in a panel discussion or serving in some other capacity, please submit a letter to Battison stating your desire. Because of the number of contacts required to organize a program as large as the '88 SBE convention, only written abstracts and letters of interest can be accepted.

The SBE will again publish a "Proceedings" of the conference, which will be distributed at the convention. Authors should be prepared to submit a camera-ready manuscript by June 30. Send your correspondence to: John Battison, conference chairman, 890 Clubview Boulevard North, Columbus, OH 43085.

Broadcast '87 reflects strong German market

By John Blau,
European correspondent

The focus of Broadcast '87, held in October in Frankfurt, West Germany, was private broadcasting. This came in response to two landmark decisions that opened up West German telecommunications.

The Media Agreement and the Fourth Broadcasting Judgment have cleared the path for private radio and television. By 1990, some 400 local radio stations and 25 local TV studios are expected to be in operation. Thus, as the influence of the Bundespost in telecommunications declines, the country expects a strong market for professional broadcasting hardware and software.

Broadcast '87, which encompassed film, radio, television and video, included audio and video workshops. The series of audio workshops featured technologies such as digital editing, digital audio processors, hard-disk recording and computer-controlled transmitted operations. A fully equipped production studio allowed guest speakers to demonstrate new techniques.

The video workshops also emphasized learning by doing. Themes included studio automation, time-code synchronous coupling, fast-speed films and CCD cameras. Computer animation was demonstrated at a TV graphic live studio.

Private station owners, as well as engineers and managers in government and corporate production studios, represented the largest group attending the show.

Continued on page 126

BROADCAST ENGINEERING

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News technology

A guest editorial by Joseph Barnes

"I covet the best for broadcast news. In broadcast news the challenge is greatest. Nowhere is clarity in writing so necessary. Nowhere is the clock so tyrannical. Nowhere is the audience and the responsibility so great. In your hands has been placed the greatest invention, not the satellite truck or the computer, but the word."

Ed Bliss, former chief news writer, CBS-TV, 1987 RTNDA convention, Orlando, FL.

Television news has gone through some radical changes within the past 10 years. The forces that have pushed those changes are economics and technology. It is hard to separate one from the other. This month as we examine outside broadcast activities, the bedrock of broadcast news, a perspective on the marriage of news and technology is in order.

TV news is one of the most powerful and influential forces in America today, yet we are a nation of copycat broadcasters, not innovators. For broadcast news to grow in the future, there must be greater innovation, creativity and risk taking. New ideas must be tried. TV news cannot rely primarily on technology to dictate the path of future programming.

TV news has the ability to take us anywhere, *live*. Instantly. TV news can be immediate, but immediacy must be more than fluff live shots from a fair or beside a freeway. Live coverage should mean live *news coverage*, not manufactured live shots.

Sadly, gone are the days of Ed Murrow, when journalists were good writers and uncovered stories regularly by cultivating news sources. Now, words like *reporter, journalist* and *editor* have been replaced by words like *clothing allowances, agents, talent* and *anchors*.

"Sources" are all too frequently "USA Today," the local paper or press releases. It's become a star-studded scene of personalities. In the transition, journalism in the classic sense has been lost

TV news faces another challenge today: blanket cost-cutting without careful evaluation. Too many stations are slashing away not just the fat, but the bone. The challenge is to reduce costs but keep quality high.

The news department creates the most important community image a station can have. Costs can be cut in many cases, and greater productivity is possible in many cases. But cutting budgets inside a closet of numbers won't help anything but the short-term bottom line. And it will lead to a straw house that will come crashing down sooner or later.

The role of technology in these efforts is both a blessing and a curse. Advancements in camera and recorder design have made possible single camcorder units that improve efficiency and mobility. Newsroom computers have permitted increased productivity for the entire news staff. Remote ENG and SNV trucks have given stations valuable tools to increase news coverage and boost ratings. But, these same technologies cost money—in some cases, lots of money.

The first step in charting a course for the future is communication among departments and individuals at a station. The engineering department can learn a lot from news, and news needs the input of engineering. It's a 2-way street.

For those stations willing to take the risks to program for quality—not just ratings—and provide news personnel quality equipment to do their job, the long-term gains can be substantial, for the station and for the future of TV news. The possibilities are endless.

Barnes is a TV news consultant based in Martinez, CA.

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*(Suggested List)

Eligible daytime AMs may operate full time

By Harry C. Martin

In a further deregulation of the AM rules, made possible by recent agreements with Canada and Mexico, the FCC is allowing qualifying daytime-only AM stations on regional channels and on 940kHz and 1,550kHz to operate on a full-time basis. Their power levels must meet the commission's interference protection requirements to existing stations, but the newly authorized nighttime operations will not be afforded interference protection to each other.

To implement the new authorizations, the commission has calculated the permissible power of each eligible station and has sent show cause orders specifying operation at such powers. No applications are required.

Affected daytime-only stations will be authorized to operate during nighttime hours with up to 500W, depending on interference considerations. In virtually all cases, the new full-time authorizations will be at no more than the power levels permitted for the affected stations under their post-sunset authorizations. Stations that have not been eligible for post-sunset operating authority are not likely to benefit from the new rules.

The newly authorized nighttime operations will be exempt from the principal-city signal coverage requirement. Also, the commission has exempted the new operations from the requirement to remain on the air during two-thirds of the hours between 6 p.m. and midnight. For future upgrades of the affected stations, the commission said it would require a minimum power of 250W (down from the previously required 500W). However, the principal-city coverage requirement will apply to former daytime-only stations that seek to modify their nighttime facilities to use powers greater than their initial authorizations.

Presunrise rule

To minimize the impact caused by the start of daylight-saving time, the commission adjusted its rules regarding presunrise operations of daytime-only AM stations.

Martin is a partner with the legal firm of Reddy, Begley & Martin, Washington, DC.

Under the new rules, between the first Sunday and last day of April each year, daytime-only AM stations will be permitted to start presunrise operations at 6 a.m. local time with a minimum power of 10W, provided there is no interference to the groundwave contours of clear-channel stations. In many instances, stations will be permitted to operate at substantially more than 10W.

The commission plans to calculate the power limits for each daytime-only station and issue an order to show cause permitting presunrise operation at the power specified. The show cause orders are expected to be issued before April.

Technical standards for cable broadcast switches

Technical standards have been adopted for the input selector switches used by cable subscribers to alternate between cable and over-the-air TV reception. Switches that do not provide adequate levels of signal isolation may cause an incoming cable signal to be "broadcast" from a subscriber's home antenna system, causing interference to other licensed radio services. The commission decided to act because the new cable TV must-carry rules mandate that cable operators make selector switches available to subscribers.

The commission is requiring that external, stand-alone switches and switches built into TV receivers provide at least 80dB of isolation over the frequency range of 54MHz to 216MHz inclusive, and 60dB from 216MHz to 550MHz. Input selector switches that use a power source, both stand-alone and built-in units, must maintain the required isolation in the event of power failures. The method used to achieve isolation in such circumstances will be left to the switch manufacturers.

The new rules subject external, stand-alone switches to the self-testing equipment verification procedures contained in Part 2, Subpart J of the rules. They also impose other requirements intended to prevent harmful interference. The commission said it will publish an isolation test procedure for stand-alone switches.

Also adopted were requirements that cable operators inform subscribers fully of the interference potential of coupling cable signals across a selector switch. Such coupling would defeat the isolation provided by the switch.

The TV-to-land mobile interference issue

Proceedings have been initiated to develop technical criteria to protect adjacent-channel land mobile stations from interference caused by UHF TV operations on channels 14 or 69. The criteria call for minimal spacing between transmitters of proposed TV stations and adjacent-channel land mobile operations on frequencies within 3MHz of the TV channel. The degree of spacing would be less for TV stations not operating at maximum power.

The type of adjacent-channel interference problems that occur might be eliminated by filtering the channel 14 or 69 out-of-band emissions at the TV transmitter or at receiver locations.

Also being proposed is a system by which an application for channel 14 or 69 would be granted if the applicant could come to an agreement with the affected land mobile operator to accept compensation for a certain amount of interference or move to another frequency. The question being asked is whether the TV applicant in these circumstances should be required to obtain agreements from all the affected land mobile licensees or from most of them, perhaps 85%.

The commission has suggested that it might authorize non-broadcast use of affected channels where the technical criteria for joint TV and land mobile use could not be satisfied, and no agreement had been reached. Such uses would include private land mobile operations or broadcast-related auxiliary use. In some situations, allotments might be made on a multiple-use basis. Under this system, mutually exclusive applications for different services on the same allotment would be selected under new comparative criteria. None of these changes will be implemented, however, until it is determined whether channel 14 and 69 allotments will be employed for HDTV.

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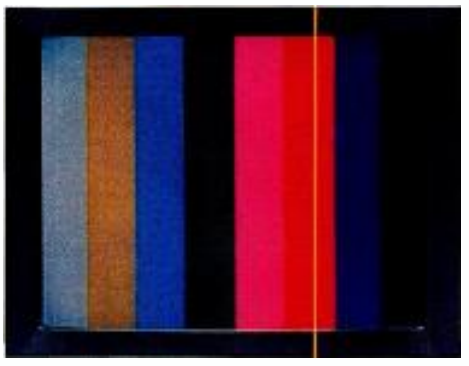

Bird watchers' guide to computer graphics

By Rick Lehtinen

Taking one trip down the aisles of a large trade show causes you to think that everything is a computer graphics system. Each booth has a new wonder box. Some of them do things that just couldn't be done not too long ago. Not only are we engineers supposed to be able to repair this equipment, but we frequently are asked to give advice about its purchase as well. To sort things out, so we can competently consult, we need to borrow a technique from bird watchers.

Finding an unfamiliar species, the bird watcher looks for key features—the shape of the beak, the talons and the physical size. These facts help determine what the bird does, what it eats, where it lives. By checking a field guide, the bird watcher can find more about the species and its proper ecological niche.

The same kind of process works for digital image systems. Inputs and outputs, operational features and the documentation reveal enough about a system to tell you what it is and whether it merits further investigation.

The family of birds contains about 2,000 genera with about 8,600 living species. Fortunately, computer graphics is less confusing. For convenience, we can divide digital image equipment into four major genera (with some subdivisions): digital effects units, character generators/titlers, still stores and graphics systems.

Digital effects units

Digital effects systems are units that operate on video that is provided to them. They modify it, twist it, turn it, color it, posterize it, solarize it, distort it in various ways and break it up into mosaic tiles. The keys to recognizing digital effects units are that they operate on input video and do it in real time (as you see it happening).

Character generators/titlers

In contrast, a character generator or production titler makes video letters. It also might move, squeeze or animate them and perhaps even put them through gyrations resembling special effects moves. But when all is said and done, the system makes letters. The key is that the unit creates and manipulates typeface or font information obtained from a library of alphanumeric character information. It does not act on input video per se.

Lehtinen is staff engineer for KSL-TV, Salt Lake City.

Still stores

A still store is essentially an electronic slide projector. Images are stored digitally, usually onto a magnetic disc medium. Later, images are retrieved singly or in sequences, according to the instructions given by the operator. Some systems allow automatic wipes and dissolves between program and preset channels. An exciting new generation of digital disc recorders are super-quick, extended-memory units, so fast that they can retrieve frames in real time and are large enough to hold more than a minute's worth of video. With all-digital circuitry, they can layer images without generation loss by merely writing in some extra bits to memory, as opposed to the erase and rebias method of videotape, which destroys what went before.

Another item on the still-store horizon is the laser videodisc. Although videodiscs gradually are gaining ground in the industrial markets, to broadcasters they still are something for which a 1-inch master tape is to be prepared. Still, this bird just might fly, particularly for archiving still photos.

The storage capability of graphics systems can resemble a still store. The key to recognition is that a still store doesn't create anything, but just records and plays back.

Graphics systems

Finally, the computer graphics system creates frames of video. For complex movement, we must record a number of frames sequentially on tape or another storage medium. The graphics system may capture input video and alter or modify it (like an effects system), but rarely does the system operate in real time. Graphic images may be stored as single frames or as a set of instructions to tell the computer how to recreate the image. The key is the creation of video, as opposed to the creation of characters or performance of real time video effects.

There are at least two species of graphic art systems. The 2-D or cel system takes its name from the animator's stand, in which one picture is one cel. To animate, you create lots of cels and flip them quickly to see the motion. Anything you can imagine on paper can be done in 2-D, such as cut-and-paste of diverse images to form a composite or to move items around the screen. Complex animation can be generated. However, remember that it is 2-dimensional. If you want to reveal a new face of a spinning cube, you must make and recall from memory a picture drawn to show the previously hidden face (and its perspective).

On the other hand, 3-D systems use recorded characteristics of objects and calculate the shapes of the objects on a frame-by-frame basis. As you move the object around the field of vision, the computer keeps track of which surfaces are visible and which surfaces are hidden.

Shades of confusion

There are gray areas where image-processing species intermingle. For instance, at least one character generator has the capability for making characters and maneuvering them in ways that resemble an effects unit. An optional font compose system for making new characters and an optional paint system for composing backgrounds and stills expands the versatility. The paint system includes a feature to scan in video with some capability for modifying it. Once an image is finished, an optional on-board still store keeps the image until later. So how do we classify this system? It is really several things at once.

Weather data systems are similar. Not only do they receive data from an out-of-house computer database, but they also display it and produce 2-D animation of frontal lines and jet streams.

You can expect the next generation of digital imaging equipment to be a bird of still a different feather. Fortunately for bird watchers, natural evolution is slower and easier to follow.

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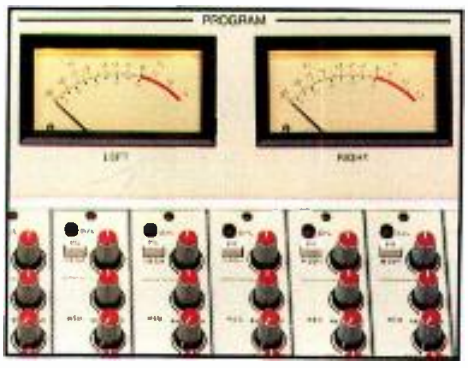

By John Battison, P.E.

In recent years, the FCC has shown an ever-growing interest in directional antenna operations. New stations are finding increased concentration by the commission on obtaining concrete proof of adherence to the standard directional antenna patterns. Existing stations, when their licenses come up for renewal, quite frequently are subjected to unpleasant shocks. Examination of the operating logs by the commission's inspectors often discloses that the directional antenna system has been operating outside its licensed parameters.

Some of the older stations also are being required to update directional antenna proofs, which may have been made 30 or more years ago. Many of these stations have not been reproofed since the original license was issued. In some cases, the commission's requirements are satisfied by explaining any discrepancies on the operating logs. For other stations, a skeleton or partial proof is the only thing that will satisfy the commission's engineers.

New monitor points

Major problems frequently are encountered in reproofing directional arrays installed 30 or more years ago. Many of the original measuring points along the radials have been built over, or are rendered useless by the proximity of buildings or overhead lines. Many times, too, monitoring points that have become old and trusted friends over the years are found to be, at the least, misleading, if not downright untruthful. Where conditions around the monitoring points have changed over the years, the monitoring points often are still within the license limits. Yet when the radial is run and analyzed, the inverse fields are nowhere close to what the license permits.

In a situation such as this, the only solution is major surgery in the form of selecting new monitor points. If this is done, the process probably also will entail making a series of new non-directional measurements, using new measuring points along the radials plus, of course, a skeleton proof.

A rather unusual problem can arise when making a partial proof or reproof of an older station if the number of towers used in one of the patterns has changed since the original proof. A case such as this also may require the use of two different sets of radials—one for each pattern.

One station, which originally had a 5-tower, in-line array used in a DA-2 configuration, added a sixth tower for use in the daytime pattern only. The reworked daytime system used the new tower No. 6 and towers No. 1 and No. 2 from the original array.

The original proof-of-performance radials were drawn from center, tower No. 3, so they were good for day and night measurement purposes. When the daytime array was modified, new radials were required from the center of the daytime array.

The nighttime pattern was still referenced to the No. 3 tower. But, because of the spacing between this tower and the new No. 6 tower, it was necessary to maintain two separate sets of radials, one each for the day and night patterns. The array was adjusted so that all the nighttime monitor points were within the license specifications, and the radials were run. Practically all of the points on the original radials were found to be useless because of the intrusion of overhead lines and new construction, which in some cases completely obliterated the old points.

It then was necessary to pick new regular and alternate monitor points along the radials to complete the proof-of-performance. Although not required by the FCC, the licensee probably could have saved money by having the chief engineer make a skeleton proof from time to time. The station definitely would have been better prepared to cope with the deteriorated radial conditions.

DA-NDA switching

Many of the directional stations constructed in recent years embody control circuitry that make it possible, in the case of a DA-N station, to switch from non-directional to directional operation and back by pushing a button. In the case of DA-2 stations, although more complicated, it is possible to switch from each pattern to a non-directional pattern and back again by means of a control system.

If you are contemplating construction of a new antenna system, or updating or modifying an existing one, I recommend strongly that you include this feature in the design. Such a feature doesn't cost much, and the convenience it provides is priceless. As a matter of fact, there have been strong suggestions that the commission will, before too long, require that this feature be embodied in all directional antenna systems. I firmly believe, not only from an engineer's viewpoint, but also from the viewpoint of management (whose interest lies in preserving continuity of signal pattern during DA measurements), that this concept is a worthwhile addition to any antenna system.

The DA-NDA switching system described previously speeds up every kind of measurement operation. It is possible to go to any measuring point once only, and to read any antenna pattern value at that point in the course of two or three minutes. With such a system, readings are made under identical weather and field-strength meter orientation and adjustment conditions. I might add, in connection with NDA readings, that when questionable readings are noted at a monitor point, or when trouble in a DA operation is suspected, non-directional readings taken at the monitor point and ratioed to the directional readings give a good indication of the antenna's performance and condition.

Battison, BE's consultant on antennas and radiation, owns John H. Battison & Associates, a consulting engineering company in Columbus, OH.

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Part 2

Using parabolic antenna systems

By Elmer Smalling III

Last month we began a 2-part series featuring parabolic earth-station antenna systems, with emphasis on simple measurements and design criteria. Now let's examine some important equations that must be used by engineers to evaluate a system or to plan a new installation.

Smalling, BE's consultant on cable/satellite systems, is president of Jenel Systems and Design, Dallas.

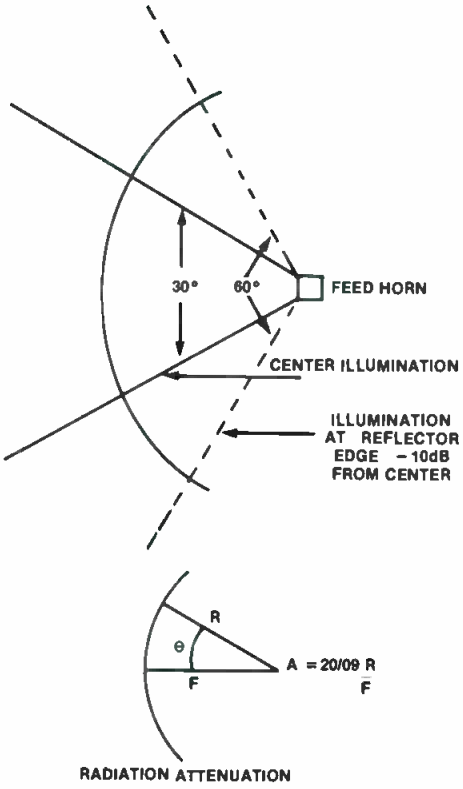

Figure 1. The radiation attenuation is related to the proper centering of the feed horn.

The most important antenna system parameter is *gain*. Gain of a parabolic reflector is

$G_{dB} = 20 \log F_{MHz} + 20 \log D_{ft} - 52.6$ or

$G_t = 4\pi \text{Area}/\lambda^2$.

This calculation gives a good estimate of the gain of the reflector while relating the total signal capture area to signal wavelength. Up to a certain point, the larger the diameter of the parabolic reflector, the more capture area or gain the antenna will have, if wavelength is held constant.

Pointing-error loss of an antenna system is proportional to the diameter of the reflector divided by the wavelength. As the diameter gets larger, the point-error loss decreases, and the antenna gain increases. The loss for a 33-foot dish is about 0.2°, and it is as great as 1.3° for a 10-foot-diameter antenna.

$g(\Theta) = ge^{-2.76(\Theta_e/\Theta_b)^2}$

where g = gain,

Θ_e = pointing error,

Θ_b = half-power beamwidth,

and $d/\lambda \leq 0.41/\Theta_e$.

All of these equations are theoretical. Variations from the ideal gain lead to efficiency of the antenna, normally ranging from 50% to 70%. Parabolic reflector efficiency is calculated from:

efficiency = $(P_{\text{RADIATED POWER}})/(P_{\text{INPUT POWER}})$

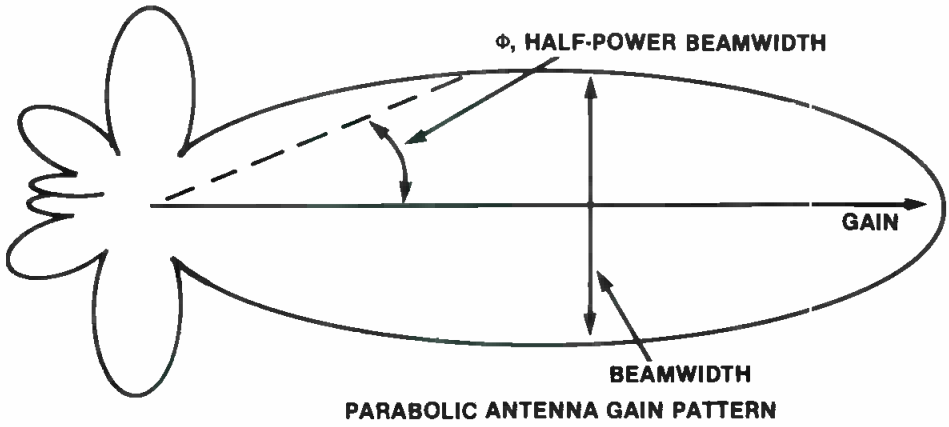

Figure 2. Beamwidth and gain are interrelated.

In an earth-station antenna system, the feed horn must provide a wavefront toward the reflector (subtend the angle), which provides appropriate signal levels (illumination) to the center and edges of the parabolic reflector. The edge illumination usually is 10dB less than on-center illumination. Because of the different signal illumination levels with changes in the feed angle, the space attenuation differs from varying off-axis angles of the feed horn. Space attenuation is negligible at small values of feed angle and becomes large at greater angles. The attenuation figure can be calculated from:

$A = 20 \log (R/F)$,

where F = focal length of the parabolic reflector and R is the off-axis feed angle. (See Figure 1.)

Manufacturers of parabolic antennas include *f/d* (focal length over diameter) as part of their specifications. The focal length (feed point or location of the feed horn) can be critical within a fraction of a wavelength. The dimension usually is specified by the manufacturer and should be periodically checked.

The best way to set focal length is to monitor a midband transponder and adjust toward and away from the main reflector for maximum signal strength. Once this point is found, check the first and last transponder (highest and lowest frequencies) to assure that the signal strengths of these have not been jeopardized by the midband adjustment. If the manufacturer has not included the focal-length dimension, but does state an f/d factor (such as 0.5), simply measure the diameter of the reflector, and calculate the focal length, using:

$F = D^2/16d$,

where D = diameter of reflector

and d = distance to focal point.

It is important to center the feed on the parabolic reflector to prevent squint or lateral beam displacement. The half-power beamwidth of a parabolic reflector may be calculated, using:

$\Theta = \lambda/(d\sqrt{p})$,

where λ = wavelength,

d = cross section diameter,

and p = antenna efficiency.

See Figure 2. |:-)))|

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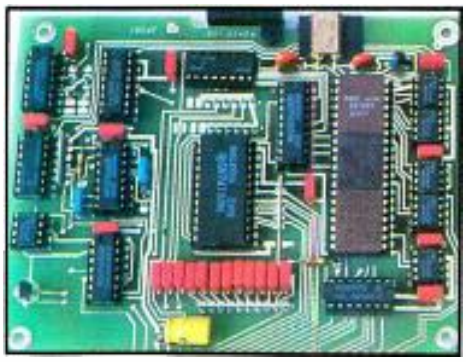


By Gerry Kaufhold II

So far in this series, we have examined a number of aspects of digital electronic circuits. Usually, patterns of binary bits have been broken into 4-bit *nibbles*. These bit patterns have been shown as address, data or control signals. Now we will look at different methods used to organize the representation of bit patterns in digital hardware.

Binary numbering

Because any discrete binary signal can have only two meaningful logic level states, either *high* or *low*, many individual bits must be strung together to represent anything useful. If a 16-bit address bus can uniquely address 65,536 memory locations, there must be 65,536 different combinations of those 16 bits.

In the discussion about memory addressing, it was shown that 256 bytes of memory constitute one page of memory, and 16 bytes of memory are one line of memory. Recall that a nibble, made up of four bits, can address up to 16 unique locations. This relationship of four bits to 16 possible unique combinations is the key upon which all digital data representations are based.

Another key item is that the first (or lowest) possible count is always zero.

Kaufhold is an independent consultant based in Tempe, AZ.

BINARY WEIGHTING VALUE	DECIMAL WEIGHTING VALUE	HEX WEIGHTING VALUE
8 4 2 1	1 0 1	1
0 0 0 0	0	0
0 0 0 1	1	1
0 0 1 0	2	2
0 0 1 1	3	3
0 1 0 0	4	4
0 1 0 1	5	5
0 1 1 0	6	6
0 1 1 1	7	7
1 0 0 0	8	8
1 0 0 1	9	9
1 0 1 0	1 0	A
1 0 1 1	1 1	B
1 1 0 0	1 2	C
1 1 0 1	1 3	D
1 1 1 0	1 4	E
1 1 1 1	1 5	F

Table 1. The relationship among the binary, decimal and hexadecimal numbering systems.

Decimal equivalents

Table 1 shows the 16 possible combinations of four bits. Each vertical column is labeled with a weighting value that identifies the number in decimal units of each column. For the binary columns, there are four weighting values (1, 2, 4 and 8). If there is a binary "1" under a weighting value, then that bit holds the numeric equivalent of that weighting.

Notice that when the binary count goes from 1001 to 1010, the decimal equivalent rolls over from nine to 10. This fact makes decimal equivalents unwieldy for doing work with digital machines that roll over every 16th count.

Hexadecimal numbering

Converting 4-bit binary numbers into decimal is a tedious procedure for humans who were brought up using the decimal system. For this reason, *hexadecimal numbering* was developed. Hex is the most common method for identifying information stored in a binary bit format.

Referring again to Table 1, note that the hex weighting value in all cases is "1." The first six letters of the alphabet are used to represent the decimal equivalent of 10–15.

The hexadecimal numbering system has several advantages over simple binary as far as human comprehension is concerned. First, note that each hexadecimal digit represents four binary bits. It follows, therefore, that a 4-digit hex number represents a 16-bit binary number. A full 65,536 unique addresses can be expressed by using just four hex digits.

Conversion process

To convert an n-bit binary number into hex, perform the following steps:

- Mark off groupings of four bits, beginning at the right-hand side of the binary number. If the final grouping is less than four bits, fill in the remaining spaces with zeros.
- Convert each 4-bit binary group into a single hexadecimal digit, beginning at the right-hand side of the binary number.

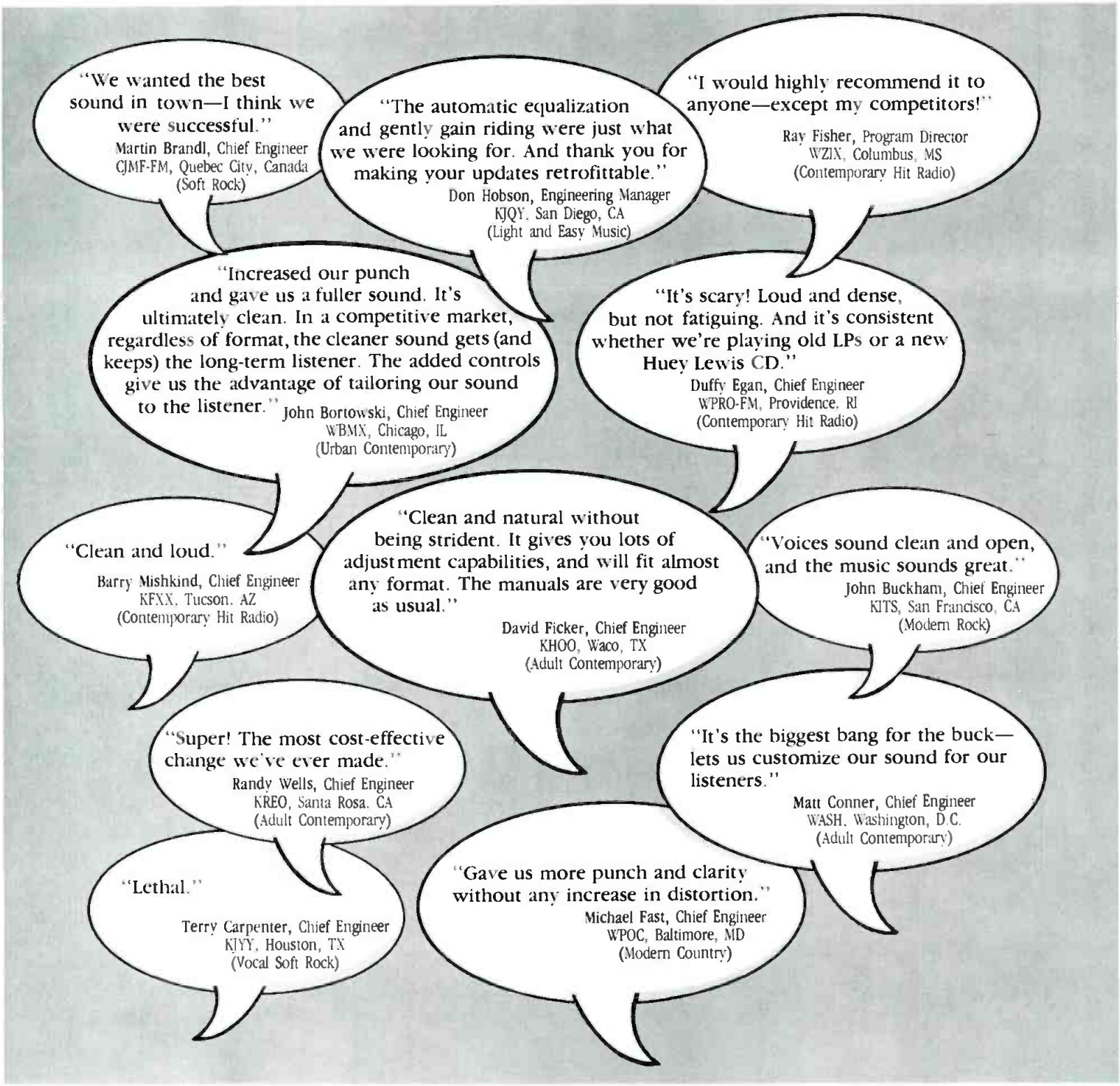
To convert a hexadecimal number into its decimal equivalent, perform the following steps:

- Convert each hex digit into its decimal equivalent, beginning with the right-hand unit.
- Using Table 2, match the weighting value to each of the hex digits.
- Multiply the right-hand number by one.
- Multiply the next number by 16.
- Multiply the next number by 256.
- Continue in this manner as needed.
- Add the individual values to give the decimal equivalent of the hexadecimal number.

Next month we will discuss additional conversion techniques. This process will enable you to convert the hex digits given in documentation to the bit patterns commonly displayed on a logic analyzer or oscilloscope.

MOST RIGHT HAND	HEX DIGIT=	1
NEXT RIGHT HAND	HEX DIGIT=	16
NEXT RIGHT HAND	HEX DIGIT=	256
NEXT RIGHT HAND	HEX DIGIT=	4,096
NEXT RIGHT HAND	HEX DIGIT=	65,536
NEXT RIGHT HAND	HEX DIGIT=	1,048,576
NEXT RIGHT HAND	HEX DIGIT=	16,777,216
NEXT RIGHT HAND	HEX DIGIT=	268,435,456

Table 2. The weighting values for hexadecimal-to-decimal number conversion.



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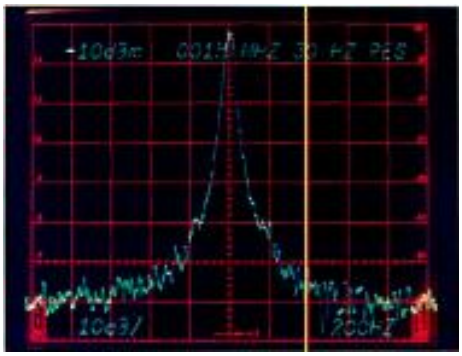

Maintaining computer storage devices

By Michael Juliff

Hard disk drives are one of the most important and most fragile components of any microcomputer system. They are called upon to store and to retrieve vital, often irreplaceable data quickly and reliably. Although hard drives typically provide years of trouble-free performance, they can and do fail.

A disk drive is a complex electromechanical device that relies on a rapidly spinning aluminum disk, coated with magnetic material, and flying recording heads to store and to retrieve data. It doesn't take much to doom a disk drive. A speck of dust caught between the head and disk, a well-placed jolt or a manufacturing imperfection can cause failure of the system.

Hard-drive manufacturers continue to make strides toward greater reliability. Yet, those efforts can be offset by the demand for greater performance, both in terms of capacity and transfer rates, which pushes the limits of current technology.

Juliff is vice president of research and development for KJ Instruments, a division of Applied Data Communication of Tustin, CA.

Media testing

The disk-drive system is most vulnerable on the media surface where data is stored as magnetic bits. Each bit is encoded as a flux reversal that the drive head reads as either a "1" or a "0," depending on the status of the flux reversal.

The drive's electronic processing circuits expect to see flux reversals spaced a certain distance apart within a predetermined window. Unfortunately, the stored data, because of mechanical misalignment or failure, may be recorded outside its window, causing a bit error. Flux reversals recorded randomly outside their windows are referred to as *soft errors*. Flux reversals recorded outside their windows under repetitive testing are usually related to media defects and are identified as *hard errors*.

The best way to detect the frequency of hard and soft errors in a disk drive is to actually test the media surface over and over, a time-consuming process. Rather than repetitive testing of the drive, the computer service industry has developed *margin tests* that accelerate media defect measurement by narrowing the data window.

Drive repair

Repair of a hard disk drive is beyond the scope of most broadcast engineers' expertise. Fortunately, numerous service depots have been established to support the growing small computer market that specializes in hard and floppy disk-drive repair.

Special measurement systems are available to exercise and to check a drive quickly and thoroughly. An efficient approach to this type of work is the PC-based disk tester, capable of conducting and recording a wide variety of measurements.

With a PC drive tester, the service engineer or technician can develop test sequences on a menu-based program generator. From a main program menu, the user selects general test categories to create the required test sequence. Test systems are available that offer a continuously updated on-screen display of the unit's performance under test. Figure 1 shows a typical readout.

Troubleshooting

As an example of what a sophisticated disk tester can do, consider a problem hard drive in which data is randomly written to the wrong locations, corrupting data integrity in the process. The technician suspects the problem is caused by a shift in drive rpm. To determine whether this is the case, the technician can program a tester to monitor disk rpm for several days and report discrepancies. The rpm shift might be traced to excess vibration resulting in premature bearing wear. Without the appropriate test equipment, such a problem might be impossible to identify.

The availability of sophisticated test instruments can result in considerable savings of time and money. The key is having the right test equipment and knowing how to use it.

Most broadcast engineers have little interest in attempting to repair a piece of equipment as complicated and fragile as a hard disk drive, and for good reason. Embarking on a repair job without the needed test gear can cause nothing but delay and needless headaches. |:-)))|

Mfg: SEAGATE Model: ST506 Operator: CHARLIE Date: 06-09-87
Test: MD506 Serial: BA13452 Station: A92 Time: 16:00:31

DRIVE CONFIGURATION

Cylinders	= 153	RWC Cylinder	= 128	Sectors/Track	= 32
Heads (R/W)	= 2	Precomp Cyl	= 128	Sector Interlv	= 1
Step Rate	= 3ms	Step PW	= 10µs		

STATISTICS

Seeks	= 2,388	Seek Errors	= 0	Status Errors	= 0
Reads	= 2,051	Read Errors	= 0		
Writes	= 1,264	Write Errors	= 0		

TIMING SUMMARY

Recalibrate Time	= 4,251.28ms			PASS
Minimum Seek Time	= 16.03ms			PASS
Maximum Seek Time	= 525.75ms			FAIL
Maxcyl/3 Seek Time	= 202.69ms			PASS
Maximum Step Rate	= 20.00µs			FAIL
Index Pulse Width	= 195.75µs			PASS
Index to Index Time	= 16.74ms	Speed	= 3,584	PASS

DRIVE ERROR SUMMARY
Data Error(s) = 1

DATA MARGIN SUMMARY

Head	Cyl	Early +	Late =	Total
0	4	36.1	38.2	74.3
1	4	38.2	41.4	79.6
0	152	38.2	40.4	78.6
1	152	39.3	43.6	82.9

MEDIA DEFECT ANALYSIS
Total Media Defects = 0

********** END OF TEST RESULT SUMMARY **********

Figure 1. Display screen of a PC-based, disk-drive tester. Note the wide variety of measurements performed and the "pass/fail" determinations made by the system.

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Part 2

Management for engineers

Time management

By Brad Dick, radio technical editor

Last month's column discussed the importance of controlling the use of your time. Everyone begins each day with the same amount of time. Successful people have just learned how to get the most out of this limited resource.

People striving for effective results deliberately manage their time. Minutes add up to hours and hours add up to days. To be successful, you have to manage those minutes and hours to your best advantage. When you let external forces direct everything you do, it becomes almost impossible to reach any goals you may have set.

Crisis management

Let's examine how Chris, our example engineering manager, was spending his time. Referring to last month's column, Chris was interrupted seven times during the period from 9 a.m. to 2 p.m. These interruptions took him away from tasks he had started but not completed.

Using the categories listed in Table 1, let's see how Chris was using his time. The chart below summarizes how Chris spent his time over a 4-hour work period.

	Minutes	Percent
Reading mail	59	23
Maintenance	9	4
Administrative work	61	24
Telephone	27	10
Meetings	77	30
Individual discussion	4	2
Production work	17	7
Total work time	254	100

Chris began to read his mail three times. It usually is not an intensive task, but he was interrupted three times. Although he spent almost an hour on it, by mid-afternoon, Chris had yet to complete reading the day's mail.

Chris also began, but did not finish, his FY90 budget. You may recall from last month that his budget already was late. He probably should have made working on the budget his top priority. Even so, Chris began his day by reading the mail, not working on the budget.

Chris began working on his FY90 budget three times, spending only 61 minutes on an item that already was late. The segment times for this task ranged from as little as seven to a maximum of 35 minutes. From an efficiency standpoint, the 35-minute segment was probably the only period in which any effective work was accomplished.

During the 4-hour work period, Chris was interrupted three times by the telephone and three times by personal contacts. Let's look at the telephone calls. All of the calls were from vendors. If Chris had been in a meeting with his supervisor, would the meeting have been interrupted so he could take the call? Probably not. When you are working on an important (late?) project, consider not taking any telephone calls. Ask the receptionist or station secretary to take messages. Then, return the calls at your convenience.

Telephone
Individual discussion or conference
Dictation/writing correspondence
Planning
Personal time
Maintenance
Production work
Reading (magazines, mail)
Meetings
Travel
Miscellaneous

Table 1. Break down your time according to these categories. Add to the list as necessary to cover the work you perform.

The staff interruptions are more difficult to control. The station engineer seldom can afford to close the office door and refuse to answer it. However, don't fall into the trap of always dropping what you are doing just to meet someone's immediate need. Be responsive, but don't let others set your entire agenda.

Categorize your efforts

Now it's time for you to review your time audit results. Categorize your activities according to Table 1, or use a similar system that makes sense for you. This is not a billing log, so don't break down the categories into projects on which you are working. Now, total the amount of time you spent in each category.

The object is to see how you are spending your time. After conducting a time audit, people usually find that they spend time on tasks having little relationship to their productivity—or success.

As you examine the results of your time audit, look for periods of time spent on unproductive chores. Be aware of the small periods of time that add up. How much time did you spend bragging about your last fishing trip? How many times did you repeat the story?

Are you performing chores that could be done by other people? Be honest now. If you have moved up the corporate ladder a bit, do you still return to your old habits and do some of the "fun" things you used to do? If so, how productive are these tasks in light of your new responsibilities?

Continue tracking how you spend your time. Next month we'll look at some of the most common mistakes people make in managing their time. The mistakes are easy to recognize, once you have completed the time audit.

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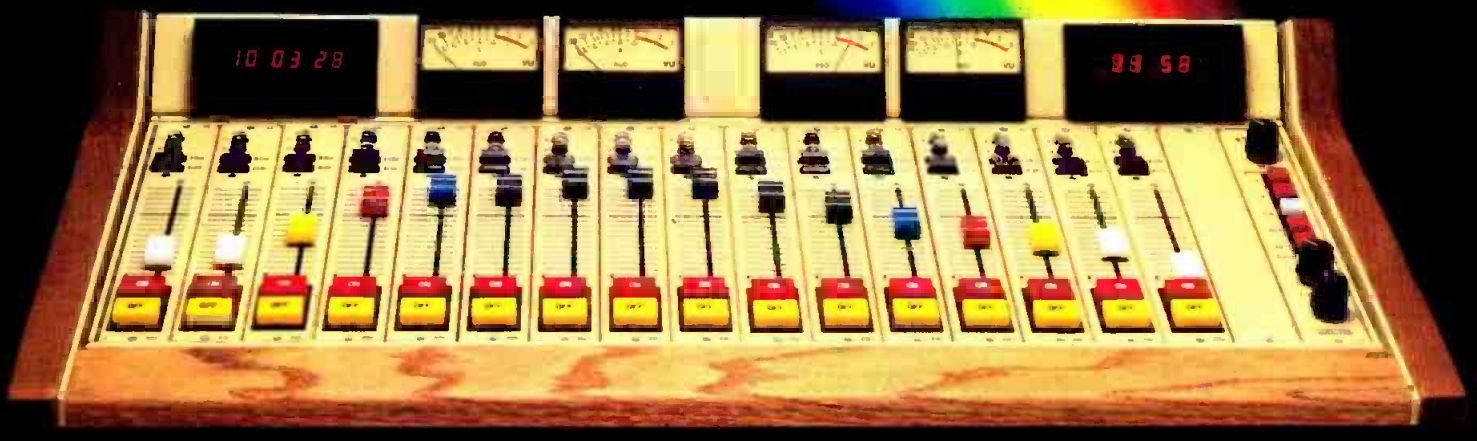

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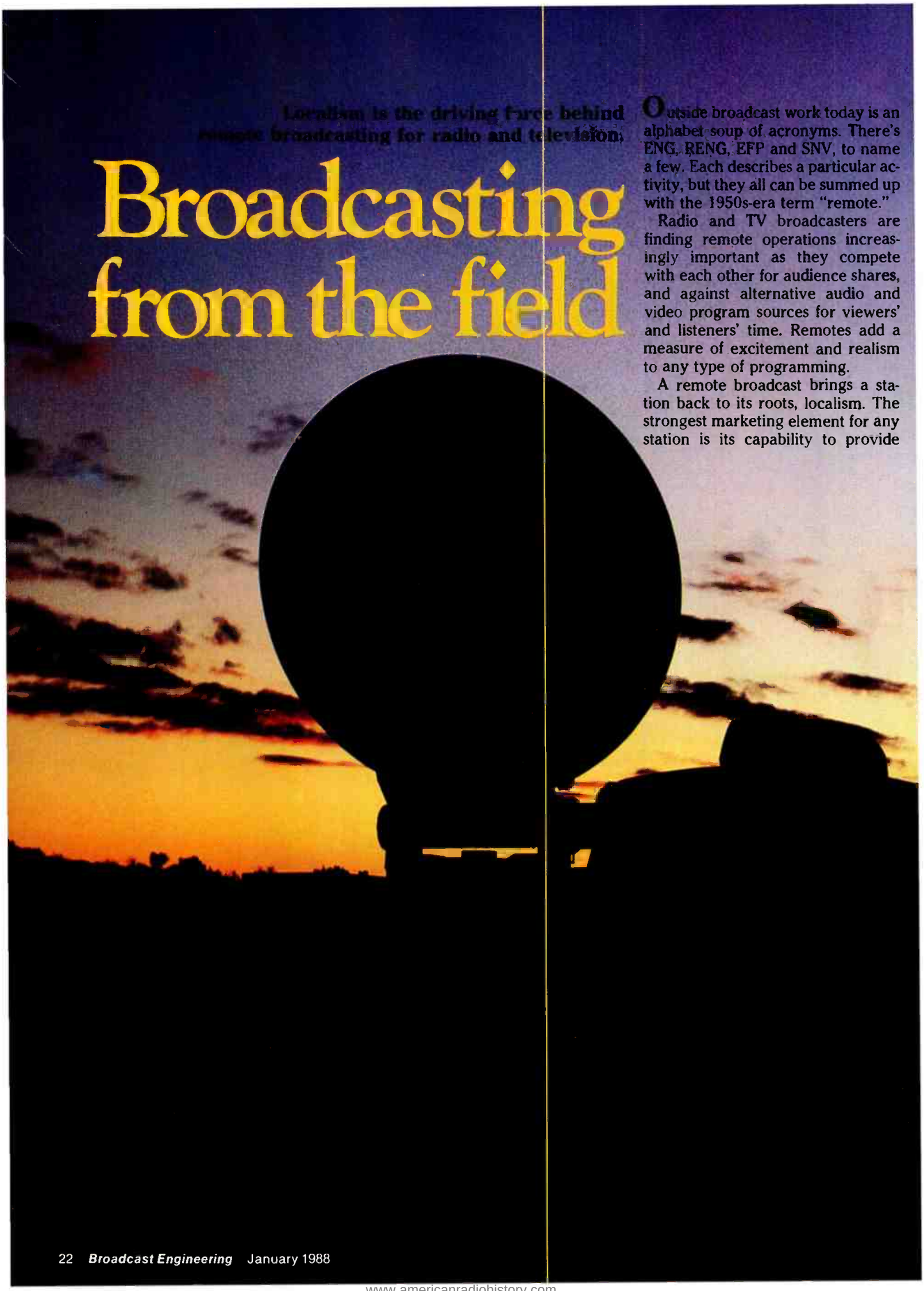
Localism is the driving force behind remote broadcasting for radio and television.

Broadcasting from the field



Outside broadcast work today is an alphabet soup of acronyms. There's ENG, RENG, EFP and SNV, to name a few. Each describes a particular activity, but they all can be summed up with the 1950s-era term "remote."

Radio and TV broadcasters are finding remote operations increasingly important as they compete with each other for audience shares, and against alternative audio and video program sources for viewers' and listeners' time. Remotes add a measure of excitement and realism to any type of programming.

A remote broadcast brings a station back to its roots, localism. The strongest marketing element for any station is its capability to provide

news and entertainment programming of interest to its *local* audience. Localism is the method by which radio and TV stations make themselves a part of their community. Stations that are involved in and care about a town, city or area are usually the stations that, year after year, do well in the ratings.

In today's fiercely competitive market, localism is critical to a station's prosperity. Let's face it, the consumer has a number of alternative sources for entertainment. Compact discs provide better audio, with no commercials, than any radio station on the air today. Pay-TV offers first-run movies with no commercial interruptions. VCRs boast an endless selection of new and old movie titles as near as the corner convenience store. Looming on the horizon are S-VHS and other improved consumer tape formats that can deliver to the home a better TV signal than is available off the air.

One thing these entertainment mediums cannot offer, however, is localism. That is the domain of broadcasting. It is the strength of broadcasting. And it is the essence of remote broadcasting.

In this issue we examine some of the critical behind-the-scenes elements of outside broadcasting:

Remote broadcasts are a feature of radio and television that will never go out of style. The hardware we use will change. The types of stories or events we cover will change. But the underlying reason for outside broadcast work—localism—will always be a part of our industry.

Jerry Whitaker,
editorial director

SNV trucks provide stations with the ultimate in remote broadcast versatility. Crews can uplink from almost any location and deliver a reliable, high-quality signal back to the station. SNV trucks have given new meaning to the word "remote". (Photo courtesy of Centro.)

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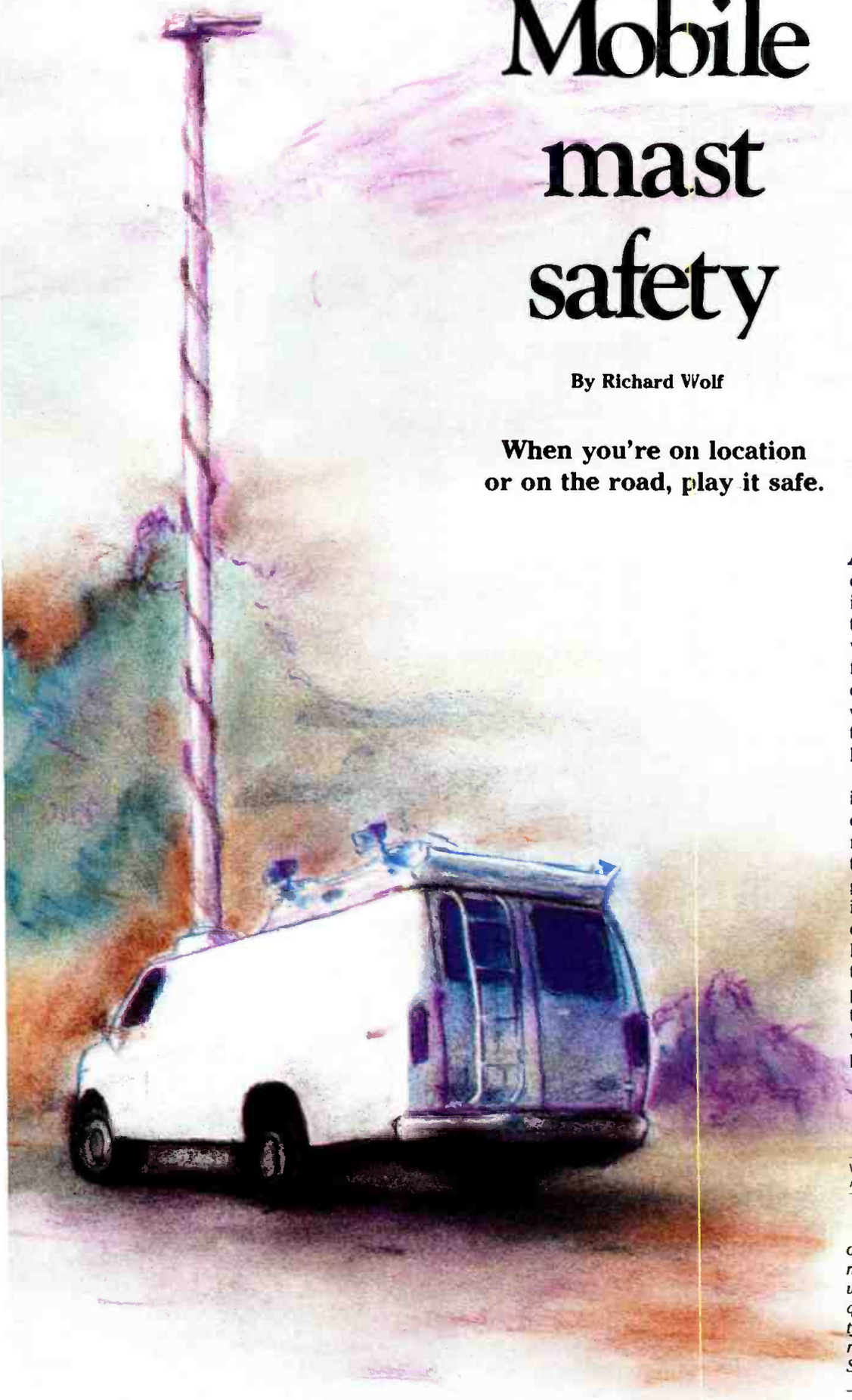
Mobile mast safety

By Richard Wolf

When you're on location or on the road, play it safe.



About 12 years ago the chief engineer of a Boston TV station was experimenting with the use of a 2GHz transmitter in the field to send back live news stories. It was, at the same time, a new and different application of microwave technology. The station wanted a mast that would place a 2-foot dish about 14 feet in the air and remotely position it. The first ENG mast was born.

Within six months, the station was using the mobile mast regularly. During one "live shot," the operators had to move the vehicle to get a better angle to the receiving antenna. There was no great problem; the vehicle was in a parking lot, and they were only going to the other end of the same lot. Why not just leave the mast up? Unfortunately, as they drove past the shack where the parking attendant sat, they took down the power and phone lines to the shack with the mast top. The industry had experienced its first mast accident.

Getting the story

It has long been established that news

Wolf is president and general manager of Wolf Coach, Auburn, MA.

The ability to take viewers live to the scene of a news event has greatly expanded the market appeal of local news. Remote location work, however, also has imposed new requirements on equipment and operators. Safety must be considered the top priority of any news crew in the field. (Illustration by Susan Stegeman.)

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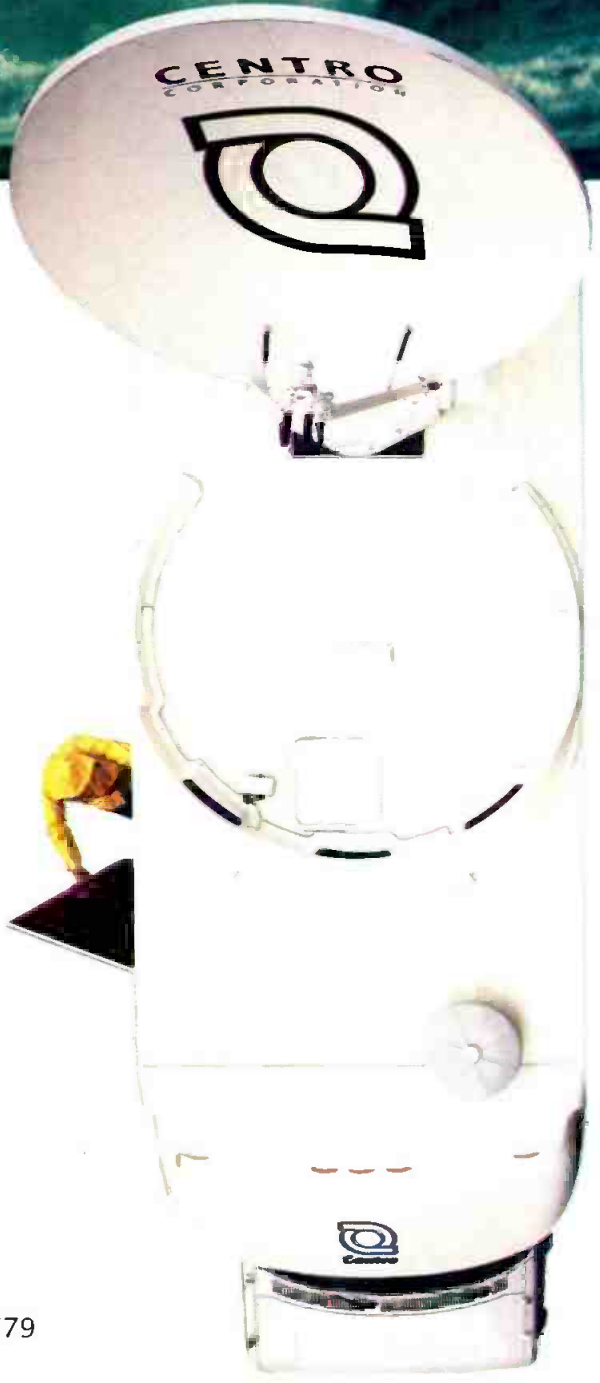

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coverage has its hazards. As news efforts have grown, so too have the hazards. Masts are taller, the areas that are covered are farther away, and, in the competitive atmosphere that exists today, the pressure to "get the story" pushes technicians and camera people to new limits.

The news vehicle operator, by nature, also must be a creative individual. The degree of creativity of some operators may be a subject for debate, but after seeing the number of ways that vehicles can be damaged, I assure you there are creative minds at work.

In trying to deal with the vehicle safety problem, we must look first at the symptoms, the damage. The potential for the greatest damage to these vehicles is in the mast, but there are others ways to have problems.

Problem areas

An overloaded or improperly loaded vehicle can be a hazard on the road. Tire blowouts, strained brakes, worn wheel bearings and other mechanical problems all can create an accident waiting to happen. I even heard of one van that rolled on its side when it took a turn too quickly. I don't like to count that as a true ENG accident, however, because the van's vertical center of mass was thrown off by the half-cord of firewood stacked in the back at the time of the accident.

It has long been established that news coverage has its hazards.

The mast, because of its movement and height, still draws the most trouble. Over the years, users have had problems in several "creative" ways. The less dangerous problems center on hitting obstructions. The lower the obstruction, the harder the hit.

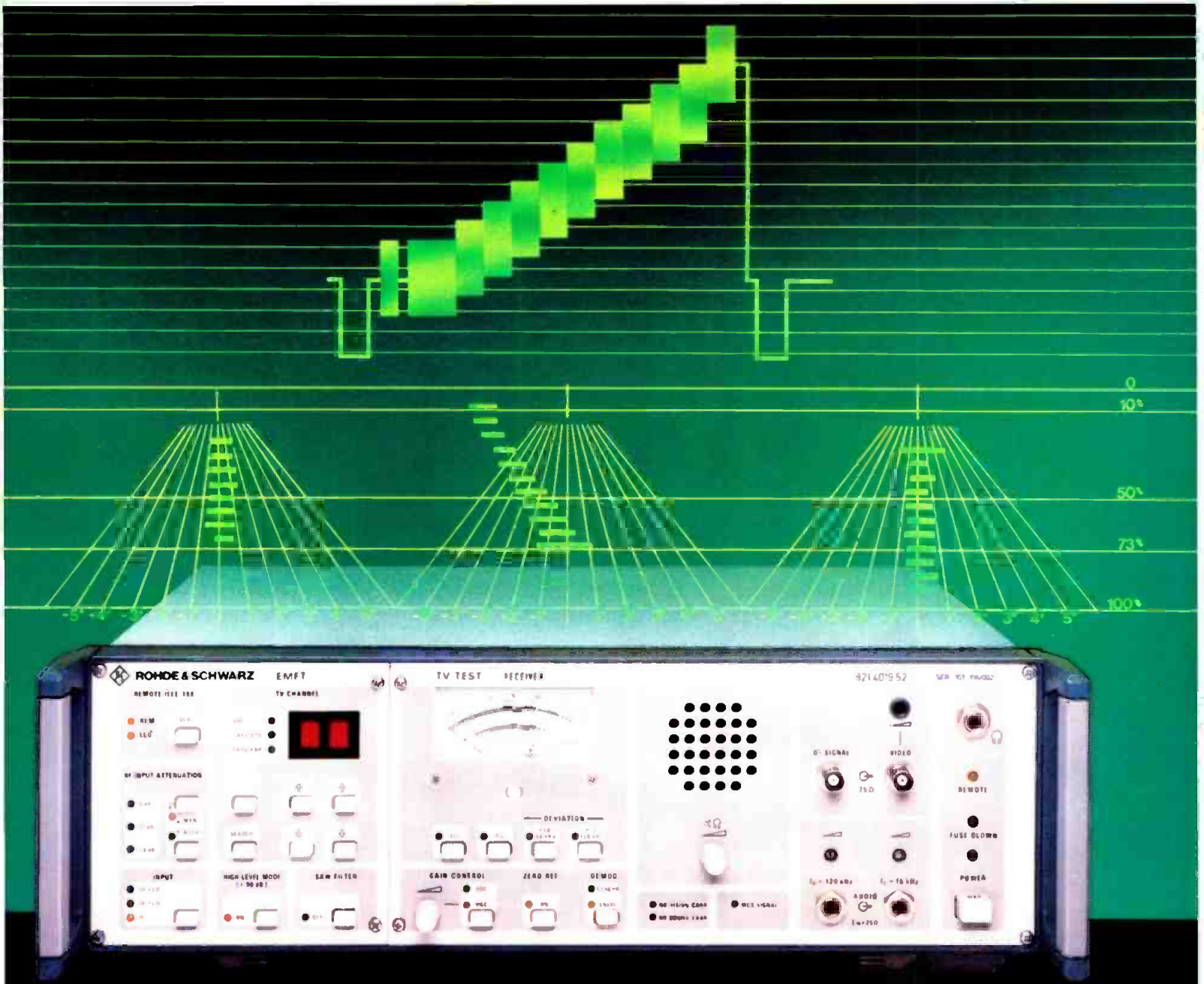
As the mast goes higher, the potential for more serious problems grows.

I wondered at one time where the impact would be absorbed if a user hit the mast while it was in the collapsed position. Well, the question was answered about five years ago when at 2 a.m. a tired operator went through a driveway instead of around the building, hitting an 8-foot obstruction. The entire roof was opened like a tin can. The mast was destroyed, along with the transmitter, the antenna, the aiming mechanism and the operator's chances for advancement at that particular station. Fortunately, there were no injuries.

The most common accident by far is the sudden removal of the aiming mechanism and antenna from the mast top by a tree or gas station canopy. The broken casting at the base of the aiming mechanism relieves the load and can be replaced without too much trouble.

As the mast goes higher, the potential for more serious problems grows. In one case, it grew as the vehicle was going down the highway. A mast valve was not solidly locked in the correct position, and the mast was being pressurized slowly as the vehicle drove away from a story at the airport. When the mast got high enough, it hit an overpass, and several sections broke off in the roadway. Again, there were no serious injuries.

It is even possible for the mast to separate without a hit. A misguided technician loosened the bolts holding the collars on a mast, hoping to reduce drag and allow the mast to move more smoothly.



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Unfortunately, the bolts were backed out far enough to disengage the collars, and the next time the operator applied air pressure to the system, the mast was launched a section at a time, landing around the back of the vehicle.

High-voltage lines

By far the most catastrophic form of personal injury comes from the potential for electrocution and electrical fire. It sometimes takes a spectacular accident to bring home just how serious the injuries can be. For me, the event happened while I was still in high school. I was driving past a little league field where volunteer soldiers had spent the weekend putting up lights for the kids. The final act of the day was to erect a flag pole, and six of them were pushing it up into place. They hit the power lines for the lights with the pole. Four of the volunteers were killed in that accident. It was a scene I won't forget.

People have been springing backs and slipping with cameras since field news began. In the past 20 months, however, the real potential for serious ENG-related injury has been realized. One man lost both of his legs, several people have been burned in separate accidents, and one life has been lost.

Why have these accidents occurred within such a short period of time? It may be that the law of averages is catching up. More likely, we as an industry had become too comfortable with the hazards. Disasters hadn't happened, so we began to think we were immune.

The question becomes: What can be done to keep such tragedies from occurring again? The answer is not quite as simple as the question. In fact, there are several answers. The solutions break down into two basic areas: vehicle design and vehicle operation.

Designing for safety

ENG vehicle manufacturers have been aware of the potential for disaster from the beginning. They have tried to anticipate the danger, designing systems to minimize it. The goal always has been to come up with an "idiot-proof" system. Unfortunately, the combined best efforts of all involved have yielded only systems that are "idiot-difficult."

Two operational states need to be addressed: the act of deployment and the possibility of movement while the mast is extended.

There are a few basic approaches to problems associated with mast movement. All are intended to disable the ignition, stopping the engine if the operator tries to move the vehicle. The first involves a pressure-sensing switch in the air line to the mast. In principle, as long as there is any pressure in the line, then the mast must be at least partially extended, and the vehicle ignition is inhibited.

The second approach involves a magnetic switch on the vehicle's roof and a companion magnet at the mast top. With this arrangement, as soon as the mast moves from the stowed position, the vehicle ignition is disabled.

People have been springing backs and slipping with cameras since field news began.

The third alternative involves a pin tied to a cable attached to the mast top. This arrangement allows for minor misalignment of the mast, while still detecting vertical mast movement. This approach can be improved by adding an interlock that permits the engine to run if the vehicle transmission is in the park position, but disables the engine if the vehicle is shifted out of park.

As with any system, there is always a desire for an override. Suppose the vehicle has to move 10 feet to get out from behind the shadow of a building. It could take up to 10 minutes for the mast to come all the way down, the vehicle to be moved, and the mast to go all the way back up. With great fear and trepidation, an additional switch could be added to momentarily override the ignition disable feature. The switch would be keyed on the outside of the vehicle and spring-loaded. This arrangement would force an operator to watch the vehicle and mast movement, and walk along to pace the movement.

Any protective measure must be weighed against the potential hazard.

However, risks are involved with this approach. One is that the vehicle could move too fast, and the braking action could damage the mast. Another risk involves the possibility of contacting high-voltage lines. If power lines are hit, the individual holding the switch would become the ground strap. Any protective measure must be weighed against the potential hazards.

Extension precautions

Recent accidents that have resulted in the most serious injuries have occurred when the mast was being extended. The options for protection in this case are just as varied as those previously outlined. Using lighting to see overhead obstructions is a minimum first precautionary step, with lights on the roof of the vehicle. Supplementary lighting at the mast top also is recommended.

The location and type of control valve for mast extension offer several alternatives. One school of thought puts the valve at the driver's door, another inside the curb-side door. One school calls for the mast valve to be spring-loaded, so the operator will be forced to stand at the operating position and watch the mast go up and down.

Manufacturers also have tried electric solenoid-operated valves, which permit the switching to be done remotely. A recent suggestion involved tying this solenoid-controlled valve to a remote infrared control link to isolate the operator from the vehicle altogether. This precaution, however, does little or nothing for individuals who might be in the van.

Any added system complexity must be balanced with the possibility of system failure and the build-up of a false sense of safety. There is no question that such capabilities can be provided, but concerns relating to cost and complexity should not be underestimated.

Another safety idea concerns proximity devices that use ultrasonics and power-sensing to detect obstructions. Such a system would be installed at the mast top and would shut off air flow if an obstruction were detected. Again, the possibility of false indications from dirty sensors, or failure to detect a single conductor that could kill, must be balanced against the operational gains.

Another suggestion involves installing some type of insulating dome so that no electrical path would exist, even if high-voltage lines were struck. But considering the variety of antennas with which users are confronted, and the number of possible positions, constructing a suitable dome would be a difficult task. Besides, unless the mast and antenna cables also could be insulated, the system would fall short of complete isolation.

Check list for safety

All of the protective systems outlined so far can work, but also can be worked around. The key to safety lies in the operation of the vehicle. Working with the protective systems designed into a vehicle, the final safety question is still up to the operator.

There is no "one size fits all" procedure that will provide fully safe operation of an ENG vehicle and mast. My best advice is for all stations to prepare a formal operational check list. Pilots (the good ones) live by check lists. Flying often has been described as hours of sheer boredom interrupted by moments of stark terror. From what I've seen in the field

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recently, there are many similarities to news coverage.

Days can go by with nothing but routine, scheduled events. Then comes the fire conveniently raging 10 minutes before air time. That's when actions must be smooth and safe.

Compile the check list with input of all staff members involved in ENG operation. Then live by the check list. Work with it until every step is second nature. The specifics of story coverage will change, but safety procedures should be the result of planning, not panic.

I have a few suggestions for the check list. The following items aren't in order of importance, and different operations will call for additions and deletions, but I ask that they all be given consideration.

- *Don't pull just off the side of the road and set up. Don't turn into a driveway just off the road and set up.*

Added system complexity must be balanced with the possibility of system failure and the build-up of a false sense of safety.

Power wires usually are run along roadsides. At least two serious accidents occurred "just off the road." In general, stay a minimum of an extended mast length away from any power lines.

- *Park on level terrain.*

When the vehicle is level, the mast will have a more predictable path of extension, straight up. It also will minimize wear on the mast.

I recently saw a vehicle with the right wheels on an 8-inch curb and the left wheels on the street. By the time the mast extended, it looked like the antenna was across the street from the van.

- *After you arrive at the site of the remote, stop and slowly count to 10.*

Recite the names of your kids, the full name of your spouse, the full name of your ex-spouse, the full name of the worker's compensation insurance company—anything to force a pause. You probably have just spent the last several minutes rushing through traffic. If it's the breaking story of the day there will be a lot of frantic activity and lots of noise. Spending 10 seconds slowing down so that the next steps are well-planned can get you on the air faster, and with less risk of making an unnecessary or hazardous mistake.

- *Look up, then look around as soon as you get out of the vehicle.* Ask yourself the following questions:

Is the area clear for the mast to go up?

Is the area relatively secure?

Which direction is the shot to the receiver?

If we do have to move the vehicle a few feet, can we do it without lowering the mast?

The key to safety lies in the operation of the vehicle.

Safety first

If your precautions fail and the worst is about to happen—the mast is going to hit power lines—yell the loudest warning possible and bail out. Jump out of the van, don't step out. Get at least 50 feet away from the van.

Although the desire to avoid the damage and embarrassment of an accident is certainly strong, fight it. If the mast is within 10 feet of wires you can see, it may already be just inches away from wires you don't see.

Obviously, it is desirable to avoid an accident, but the catastrophic injuries that have occurred recently happened when the operator saw the problem too late and tried to deal with it.

No vehicle or story is worth losing your legs or your life. It's better to take the ill fame and inevitable verbal abuse of your contemporaries that a fried van will bring. It's easy to say, and the simplicity of the words can trivialize the fact of the matter, but it's true.

Make safety a priority at your station. Don't wait until it's too late.

The broadcast industry can solve this problem once and for all if we work at it. It is up to vehicle manufacturers to make an apparatus that can be operated with a reasonable degree of safety. And it is up to you, the engineering managers responsible for station equipment and personnel, to establish and enforce safety practices. Operators won't necessarily think safety is important unless their bosses think it is important. This emphasis must come from the highest levels of management at the station. And it must come from the front-line supervisors that ENG crews deal with every day.

Make safety a priority at your station. Don't wait until it's too late. |:-):)))|

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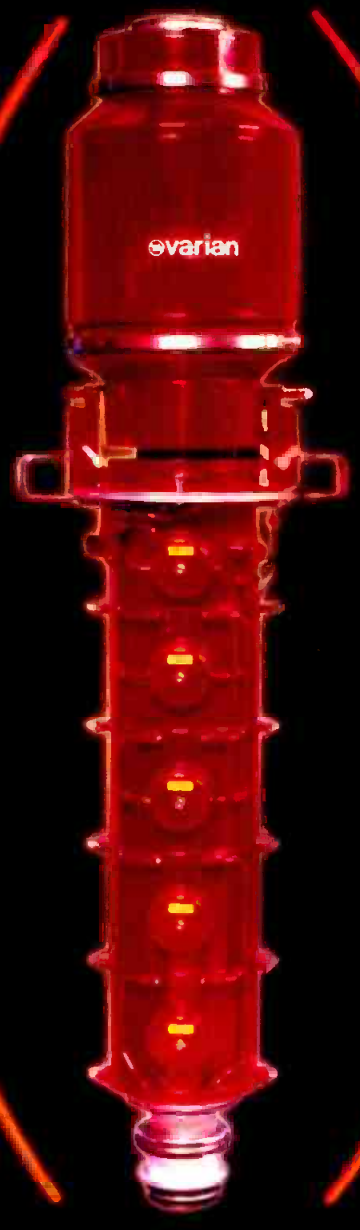

[1]Typical S-type saturated conversion efficiency of 55% as compared to 45% for other types of klystrons.

[2]18 hours/day × 365 days = 6,570 hours per year; 41,260 hours MTBF divided by 6,570 hours per year = 6.28 years.

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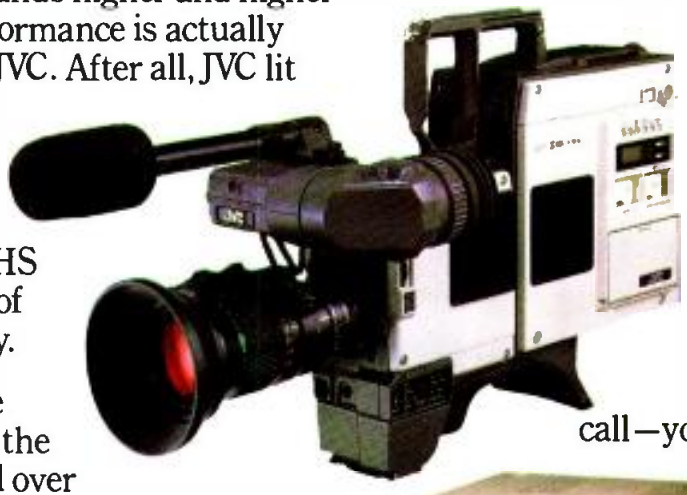

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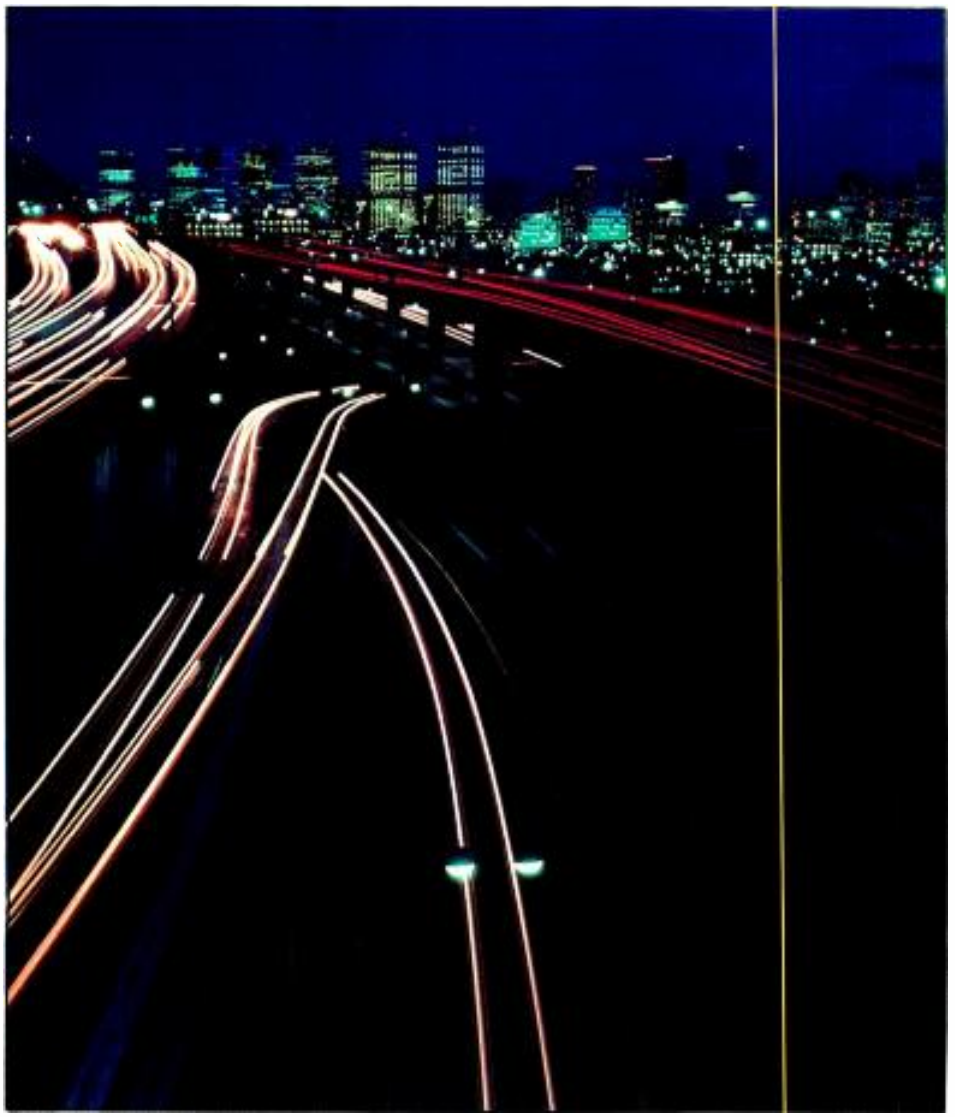
Applying cellular technology

Edited by Brad Dick,
radio technical editor

Cellular telephones provide stations with a new line on communications.



With the advent of ENG and satellite trucks, it's sometimes easier to get the program back to the studio than it is to "talk" to the studio. In the face of deadlines and competition, many stations have looked for an alternative to the standard 2-way radio for communications. To solve this communications problem, some stations are relying on a relatively new technology to provide voice channels for control and program feeds.

Background

The solution to the problem, in many cities, is cellular telephones. Cellular telephones are different from other 2-way communication systems in several ways. As an example, the user no longer owns and maintains a base of equipment to provide this service. The station may own the telephones, but all the complex equipment necessary to make them work is owned and maintained by a *radio telephone company.*

Cellular technology was born as a result of two conflicting circumstances: first, a demonstrated market need for telephone communications by people in cars or otherwise moving throughout a city and, second, the shortage of radio frequency spectrum that

Acknowledgment: This article was adapted from "A Layman's Guide to Cellular," by Martin Cooper, a series that appeared in the May–July 1984 issues of *Cellular Business* magazine. Additional information was supplied by Gentner Electronics, Salt Lake City.

For field work to come off as planned, the right hand has to know what the left hand is doing. New technology has given stations new methods to stay in touch. (Photo provided by Jeffry W. Myers, FPG International.)

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The Abekas A42 is used daily at television stations and production facilities all across the United States and Canada. With over 450 machines delivered, the A42 has proven to meet the performance and reliability demands of a wide variety of customers. Networks such as ABC, CBC, CNN, HLN, and NBC. Major independents like KCOP, WWOR, and WTBS. Post production houses like Action Video, One Pass, and Unitel. Mobile trucks such as Clearwater, Greene Crowe, and Northwest Mobile. Rental houses like All Mobile Video, Bexel, Video Rentals.

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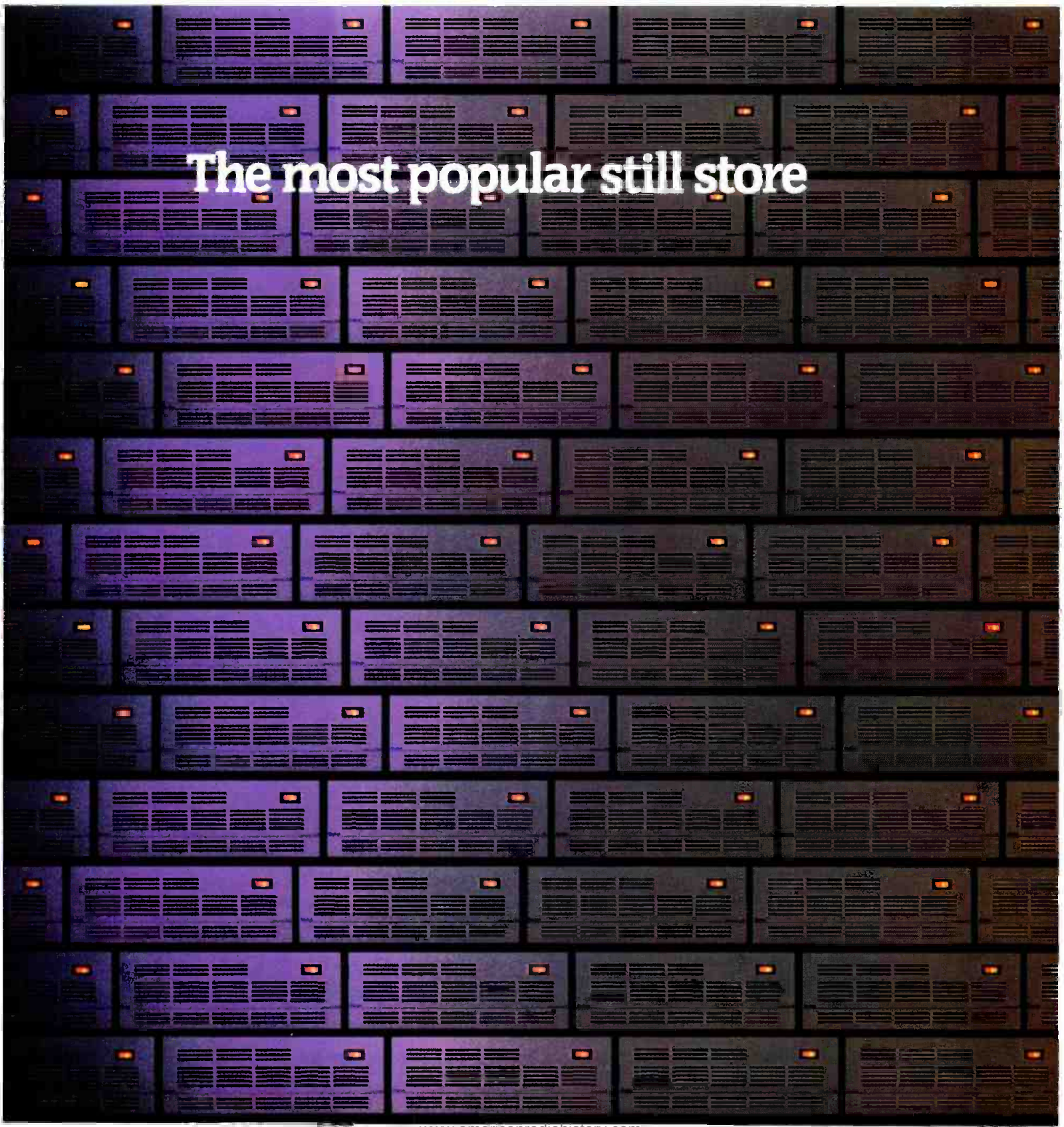

is full. The solution is to split the cells.

Cell splitting

The easiest way to look at splitting cells is to uniformly split all cells in the system. Start with the 3-cell example in Figure 2.

Each cell has a transmitter located at the center point. To split the cells, add a transmitter site at every corner of the three original cells (see Figure 3). This results in 16 cells using the same three frequencies as before. Applying this idea to the Figure 1 example could allow a capacity of 100,000 subscribers. Unfortunately, because cell usage is not uniform as just described, some areas develop the need for additional service while others do not.

Other ways of splitting cells are less disruptive and less costly than adding transmitter sites. Cells don't have to be round or hexagonal. Directional antenna systems can be used to split cells, as shown in Figure 4.

Each cell is split into three by the use of three 120° corner antennas. Note that no new cell sites were added and that the cells become parallelograms. The result is that the channel usage has been multiplied by three. Figure 5 shows how sector antennas can be used to create triangular cells, which multiplies channel usage by six.

Roaming

The ultimate use for broadcasters is to be able to telephone the station from any location. However, because there are so many different carriers offering service, it is not yet possible to call from anywhere. Successful roaming will be possible only when there is a mechanism for automatic authorization for payments, billing transfers and charge card accommodations.

The broadcaster still can use cellular phones for most daily needs. A station's work usually takes place within well-defined areas. The broadcaster must be sure that the cellular company selected can provide service for the desired areas, however. If mobile crews will be traveling outside the primary coverage area of the local cellular company, arrangements for other areas should be made in advance.

Network crews often are affected by the limited range of cellular systems. Even so, remote crews have used cellular phones to communicate from remote trucks to their satellite uplink control point while traveling along much of the East Coast. This access to home base saves valuable time and makes the crews more efficient. Changes in assignments, locations and broadcast times all can be communicated to the crews before they arrive on location. Again, the key to successful roaming is planning.

Portables

Portable cellular telephones are becoming quite popular. You can even rent a portable cellular telephone along with your rental car. However, purchasing phones seems to be the

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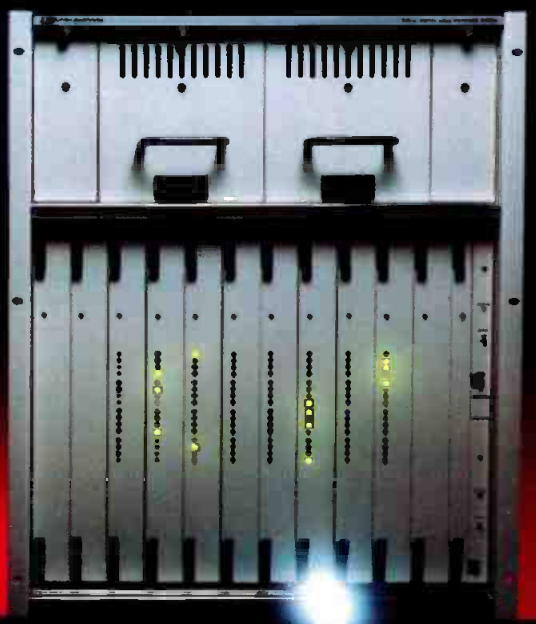

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most common approach for stations. Even with the capital expense of purchasing portables or vehicle-mounted phones, the overall cost may be lower than a dual-channel 2-way system.

For stations that invest heavily in cellular equipment, the coverage from cellular portables is an important factor. Although the basic operation is the same, portables suffer from a couple of drawbacks.

The most obvious is that the available transmission time is limited by battery capability. If the phone is to be used for a broadcast application, consider carefully how long the unit will operate before the declining battery voltage becomes a problem.

Another potential problem for portables is their location. Although the portability is an attractive feature, the results may be disappointing. A portable may operate well inside a building if it is near a window, but it may not operate at all in the building's interior, on lower floors or elevators.

Although a portable will work in a car, location is, again, a critical factor. If you plan to use it in a car, try to couple the portable to an outside antenna. Some units also may allow you to power the phone from the car battery to conserve the internal batteries.

Broadcast applications

Cellular phone remotes suffer from all the usual maladies of regular phone remotes, as well as a few new twists. One noticeable effect occurs when the user has equal signal strength into two adjacent cells. These cells, upon detecting hand-off level signals, may begin to repeatedly hand off the user to each other. The oscillationlike operation results in brief loss of signal.

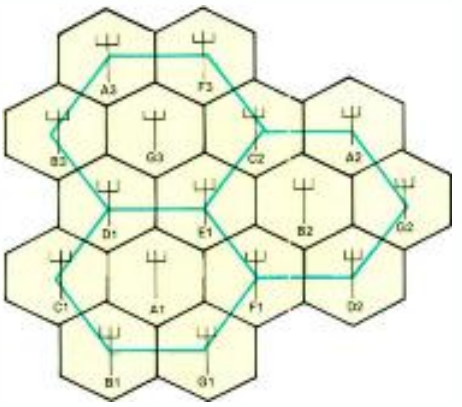

Figure 3. Splitting the original three cells into 16.

A small gain antenna directed at one of the cells may overcome the cellular system's indecision. Such a problem should be resolved long before air time. Mobile units seldom encounter this problem for any length of time because of their changing location with respect to the individual cells.

Many stations find that cellular phones provide the necessary voice communication with the advantage of telephone line access. Other stations like to use cellular phones for short programming segments or for feeding live cuts from the field. Accomplishing this feat requires a bit of trickery.

Cellular phones were designed for telephonelike applications. In other words, the designers were not thinking about broadcasters, who typically want to squeeze as much out of a piece of technology as possible. It was not long before stations wanted to be able to feed line-level audio over the phones.

Unfortunately, coupling audio into cellular phones is not something to be taken lightly. With most phones, much more than a simple audio splice is required to provide the needed interface. Control over the phone's features also is required. Depending on the particular telephone, providing all of the necessary control and audio coupling may not be an easy task. Information on devices that provide such features is available from many professional broadcast equipment suppliers. Cellular equipment dealers, on the other hand, may not be familiar with these devices.

Once broadcast audio is available to the cellular phone, any desired audio processing

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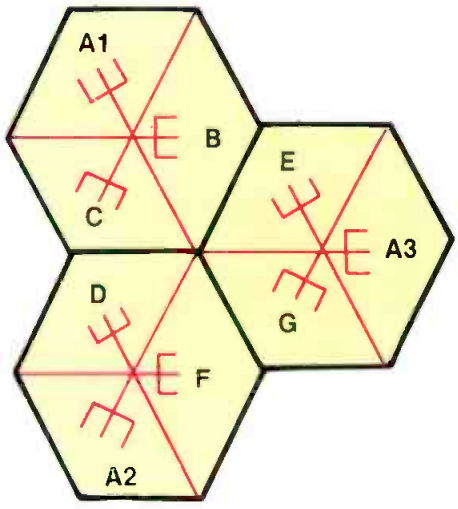

Figure 4. Using corner-antenna cell splitting results in parallelogram-shaped cells.

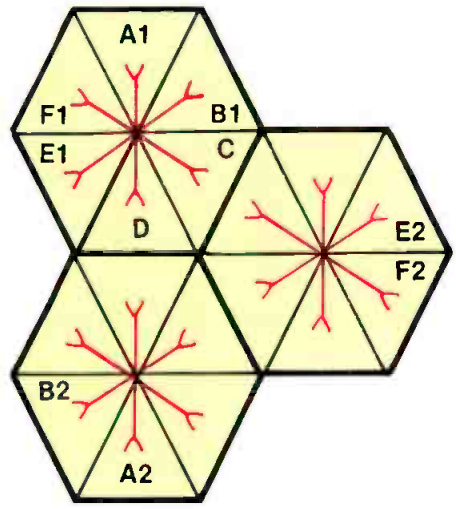

Figure 5. Sector-antenna cell splitting produces triangle-shaped cells.

can be added. The audio performance of a cellular link is similar to that of a standard phone line. Therefore, noise-reduction systems, frequency extenders and other audio-processing equipment can be used to improve the phone's audio performance. With the proper interface, using a cellular telephone for remote broadcasts can be amazingly similar to using regular telephones. However, you may not want to plan on broadcasting the local high school games on a cellular phone because the cost of air time can be prohibitive.

Careful planning

Next time you are faced with improving your station's communication system, investigate cellular telephones. They offer many advantages that 2-way radio cannot. They can provide secure and reliable communications to the station staff. The access to telephone lines is often a highly desirable feature, which 2-way systems seldom provide. Cellular telephones also allow a news crew to leave a station's primary service area and still remain in contact with the station.

A careful cost analysis may show that cellular operation can reduce the capital expenditure necessary to set up a wide-area communication system. However, this equipment probably is not serviceable by the station staff. Therefore, when selecting an equipment supplier, consider the available technical support.

Under the FCC's design, most cities can support two cellular companies. These are the companies that provide the actual on-air operation. Be sure to include all costs associated with signing up with these companies in addition to the actual telephone equipment.

Cellular technology can solve many of a station's communication problems. It is not, however, the answer to every station's needs.

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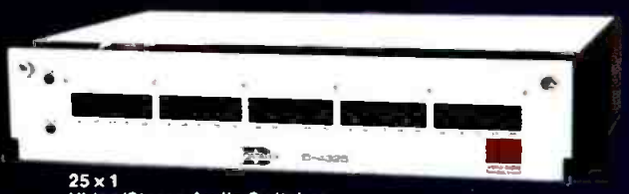

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Catching the news crew

By Ron Smith

Trunking systems solve the problem of communicating outside a station's area.

Television news departments have always needed to communicate with their personnel. In today's competitive markets, the need for good communications is becoming even more important. In particular the assignment desk needs to stay in touch with the crew once it leaves the station and is en route to its assignment.

Smith is chief photographer for KENS-TV, San Antonio, TX.

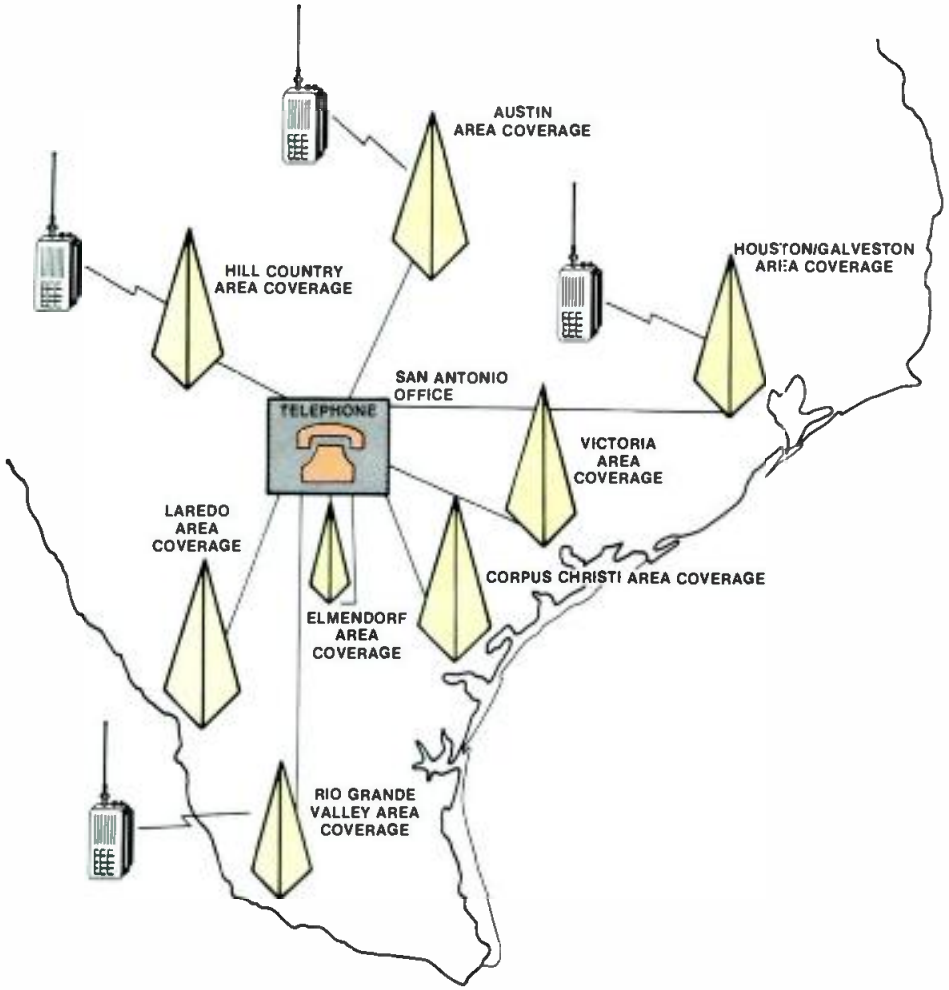

Figure 1. The KENS-TV trunking system provides coverage over an area of more than 3,000 miles.

Trunking system

One problem we encountered with our old 450MHz, 2-way radio system was that other stations could always hear everything we talked about—from checking out to eat, to that tip call about a big drug bust.

KENS-TV, San Antonio, TX, has solved that problem with a *trunking radio system*. The system uses a base computer to handle all channel assignments. The 20 channels make it hard for the competition to monitor us. A total of 40 800MHz receivers would be needed to hear what we are saying. Even then, keeping track of all the conversations would be almost impossible.

The 800MHz trunking system has proved to be a good way to maintain security and maximize operations. The system works well in the downtown area and even in most of the buildings in the city. In fact, it covers the area better than our old lower-frequency system did (see Figure 1).

The new system provides us with another bonus, a telephone. Having access to a telephone is often a real help for the night crew.

The station helicopter also is equipped with the trunking system. We added a vehicular repeater to the 800MHz system so that if we do a live report from the ground a hundred miles away, the crew still has communication with the station. The helicopter also has the capability to relay a signal from the ground to the helicopter and back to the station. This feature provides communications with the camera operator and the reporter.

Additional cities

Out-of-town stories present special difficulties for news departments, and it's here that

Continued on page 52

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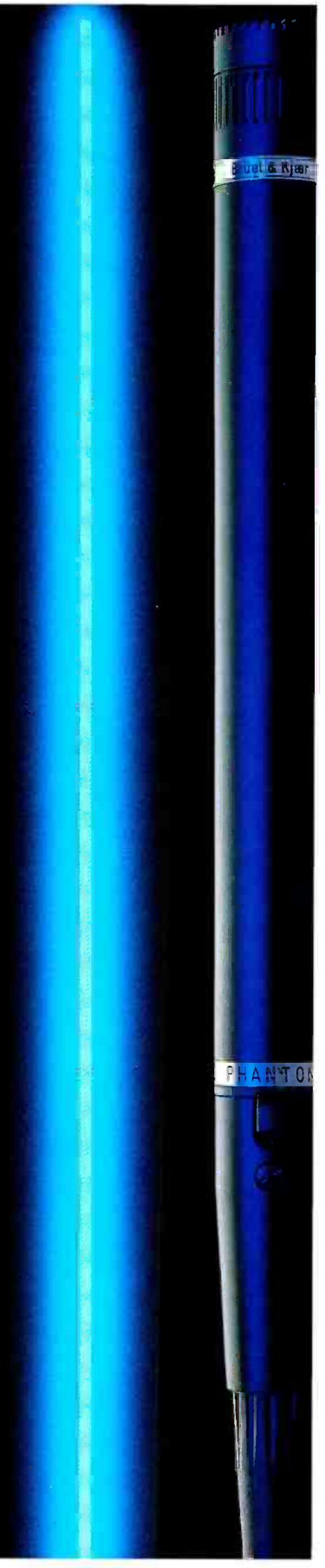

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Zeus processor (left), TBC-7 (front)

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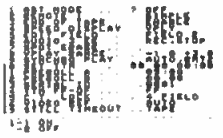

Its unique on-screen menu eliminates cumbersome reference cards by displaying operational setups and non-standard conditions in plain English.

And it's interactive, so you can check and quickly change setup parameters—without getting lost.

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Multi-Gen Setup. Better quality video over more generations.
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(left to right) VPR-6, VPR-3, VPR-80

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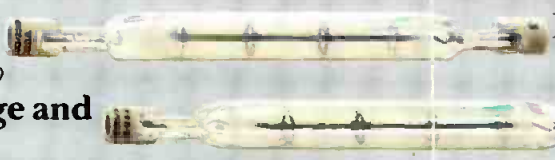

The pace is frantic. Five minutes to airtime. Late breaking news has just been handed in. As the countdown begins...the lights go on.

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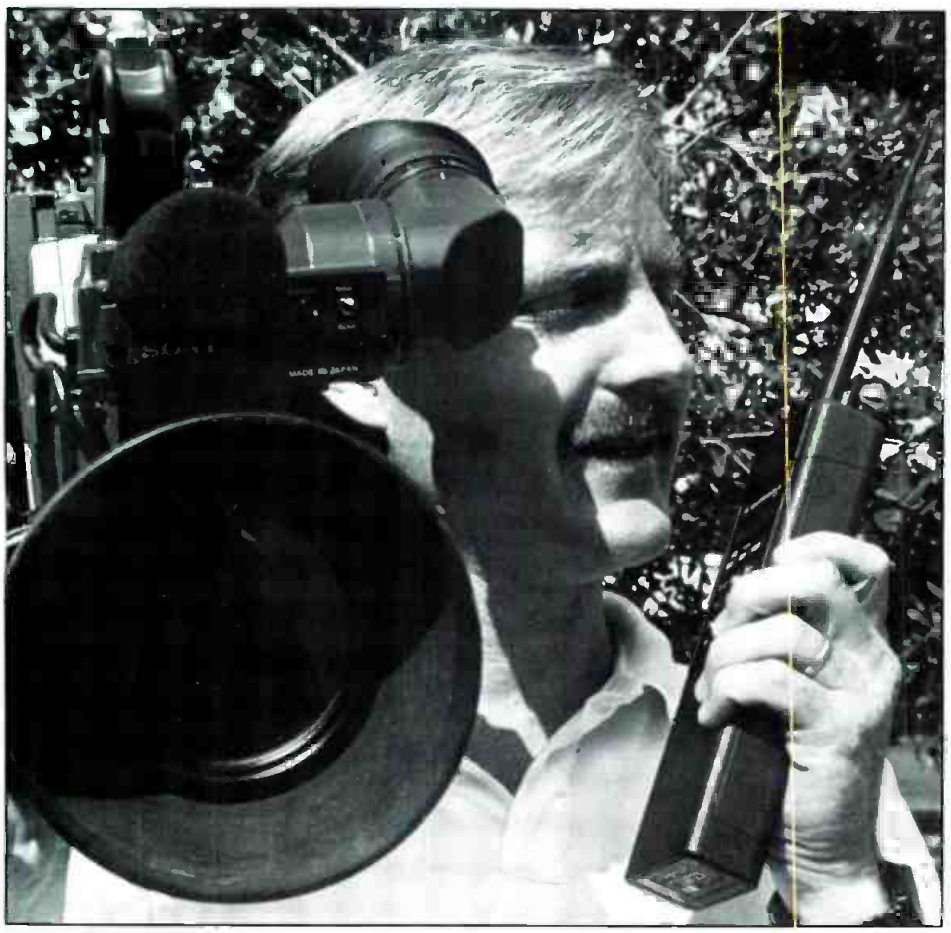

The trunking system allows photographer Rick Hardman to communicate with the assignment desk, although he is 150 miles away in Corpus Christi.

Continued from page 46

the trunking system is a particularly worthwhile investment. The assignment desk no longer has to wait for the crew to call in by phone for updates and/or instructions.

We operate on a network that allows us to have phone communications with any one of the six cities where we most frequently cover stories. This network provides coverage of more than 3,000 square miles—including Austin, Laredo, Houston, Corpus Christi, Victoria, the Rio Grande Valley and a large area of our hill country.

When a crew leaves for one of the cities in which we have a system, the radios are switched to that system. If the story has changed or other information becomes available, the information can be relayed to the crew long before it gets to the location. There is one drawback to the network. The field unit cannot initiate a call to the base from that city. However, if we have two crews out of town and in the same city, the crews have the capability to talk to each other, just as they do in San Antonio.

Equipment

All of our news units have a convertible handi-talki with a 3dB gain antenna. Each of the hand-helds is a 3W unit capable of operating on up to 16 different systems. Each of

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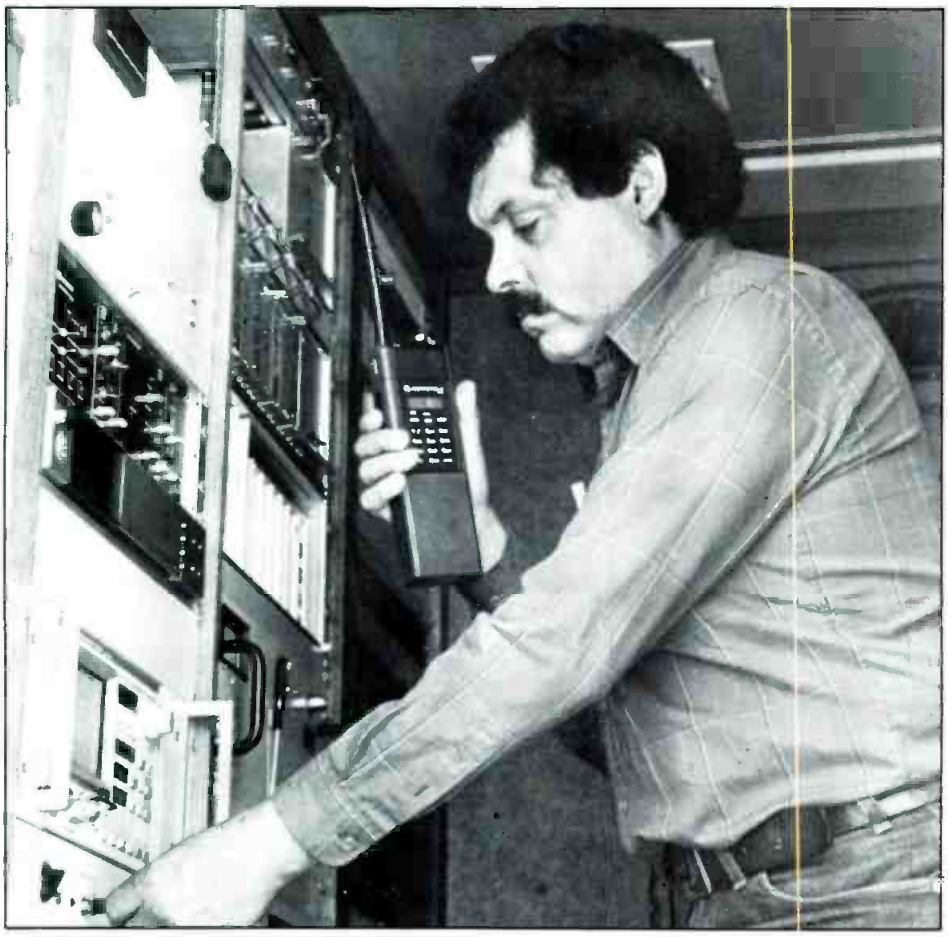

The hand-held portable allows satellite truck engineer Xavier Luna to communicate with the news crew, which is not yet on location. The staff is operating in Corpus Christi, far from its home base.

these systems can operate as four subsystems.

The newsroom has one control station at the assignment desk. There is a desk phone at the producer's desk and at the studio where we receive our microwave feeds. These two desk sets are connected to the main control station. Master control has a control unit, which operates on a second channel used only for the coordination of live shots. This keeps the newsroom channel free for news operations.

Each of the hand-held radios also can operate on a simplex channel. This is useful when the unit is out of the trunking system range. This allows units to talk to each other, although the range is limited to only a couple of miles. This feature also allows the unit to talk to the helicopter when it is within about 10 miles.

Seven of the hand-helds have a phone patch. Two of these are installed in the remote trucks, and the others are kept by key personnel. Because there is about a 5-minute limit on the phone, we cannot use it for IFB. This limitation comes from the trunked network design, not the handi-talkies. The vendor claims it is not possible to extend the talk period beyond the 5-minute limit without creating major problems for the entire system.

All photographers keep a hand-held radio

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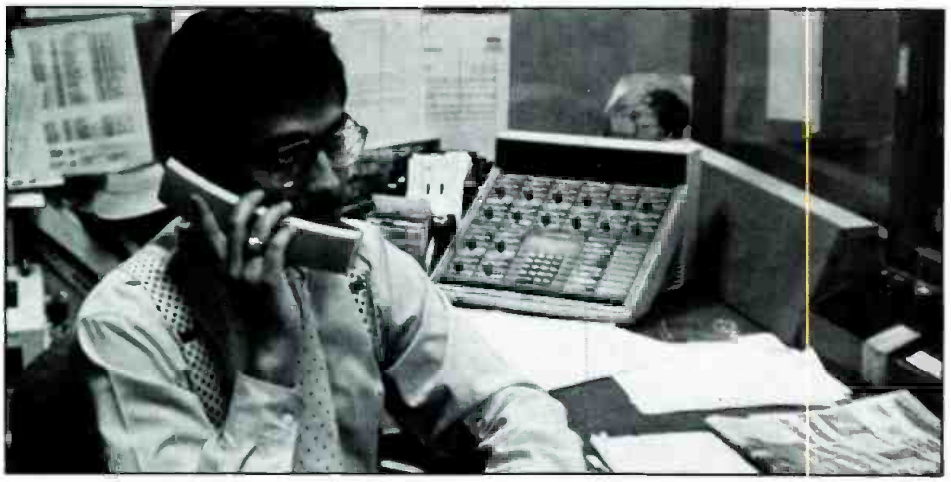


The master control system, shown in the background, allows assignment editor Frank Guerra to instantly communicate with his crews even though they are located in another city.

with them at all times. This provides instant communication with the crew—no more paging the photographer and waiting for a return phone call.

Performance

The system has been in place for 1½ years with only two failures. Even then, we never completely lost communications. If a major problem develops, the system jumps to a preselected channel and operates in a repeater mode. At that point we are part of a group of users who have to share the system and can hear each other's transmissions.

Our radio system has more than paid for itself. For example, soon after we had the multicity system installed, the gubernatorial election was held in the state capital, 75 miles away. The capital is one of the cities in which we have a system. Not only were our two crews able to talk to each other, but the producer and executive producer were able to call everyone at once to distribute information.

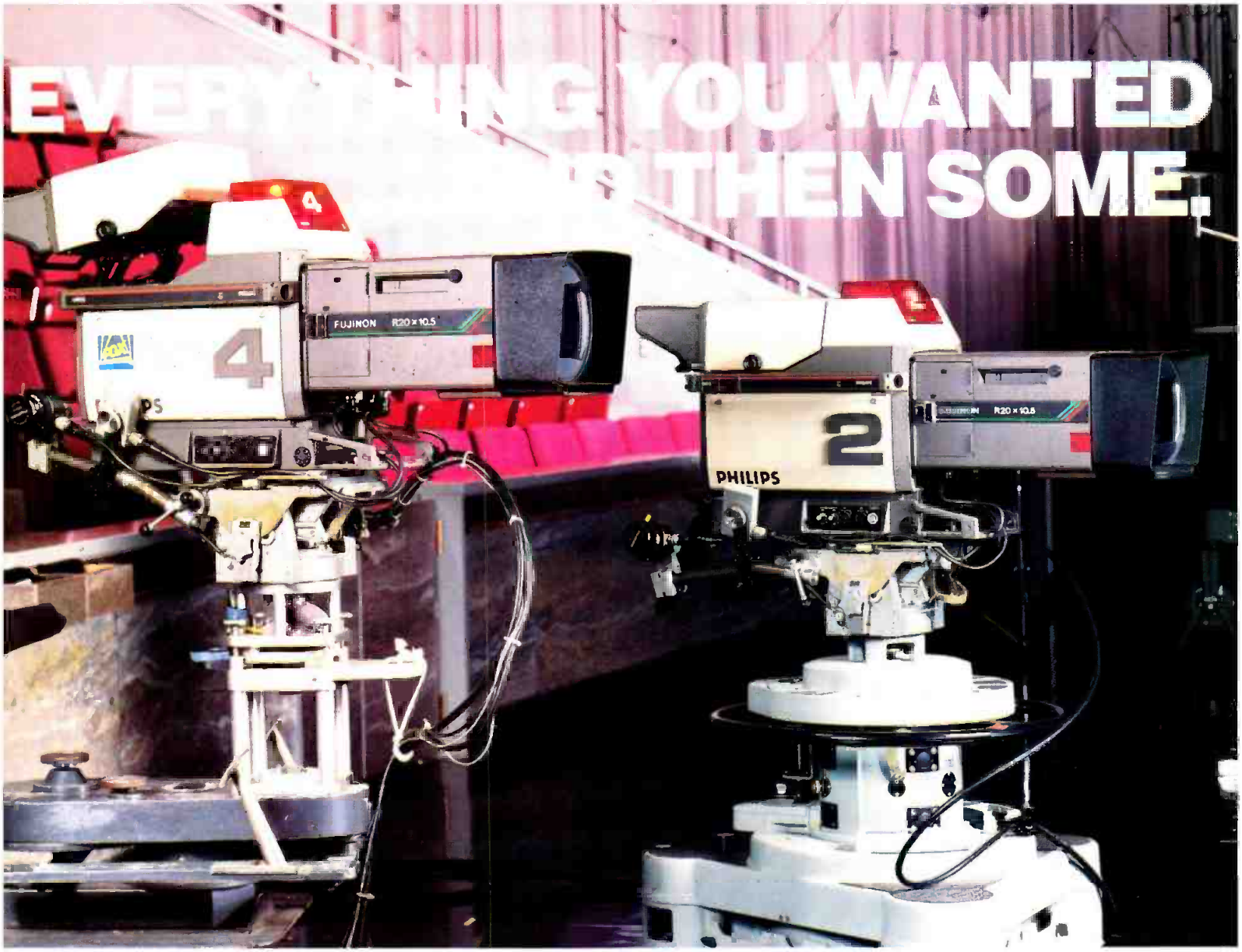
We had our two 5 p.m. anchors hosting the show from different locations—one at the incumbent's headquarters and the other at the challenger's. Before we went on the air, one of the phone lines we had ordered went down. Our producer called up the Austin trunking system on the phone, and everything went on fine. We finally got a working phone line, but we kept the radio system up just in case. There is a system time-out of seven minutes, but there is always a warning tone. It's a slight inconvenience, but better than not having any communication at all.

One of the major advantages of the trunking system is that it is expandable. This system will not become obsolete in three or four years. When the time comes to add more cities to our system, we can. The local radio shop will be equipped within the next few months to burn the PROMs so we won't have to send the radios off to be programmed, as we did the first time.

The basic system cost depends on how many units are needed. A monthly operation budget also must be set aside to cover the costs associated with the telephone and 2-way use. This cost also is based on the number of units. Each phone is allowed a certain number of free minutes per month as a part of the basic fee. If the usage exceeds that amount, a charge of approximately 35 cents a minute is incurred.

It is a good feeling to know that the other stations cannot hear your communications. It's also great to have a way of contacting the out-of-town crew that is covering the biggest story of the week. You don't have to wait for them to call in and tell you that they got it. You can call them. |:-)))|

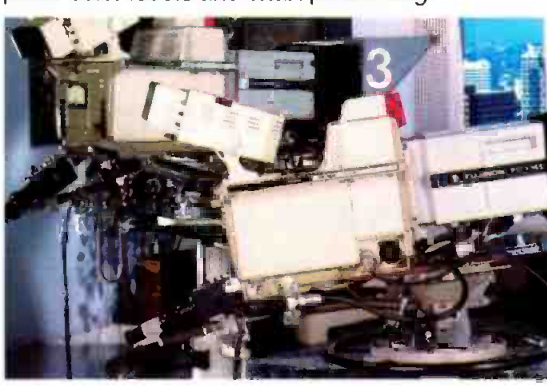
EVERYTHING YOU WANTED [illegible] THEN SOME.



We asked camera operators, engineers and directors what they needed and wanted most in studio lenses. Here are the results. Whether you're behind the camera or behind the scenes, you'll appreciate what Fujinon has accomplished.

These new lenses are lighter, more compact, more maneuverable. Optically, electronically, electro-mechanically...in terms of performance, range, operation, setup and servicing, they offer advantages you can't get in other lenses.

All major components, including power supply and pattern projector, are modular. Motherboard construction and no wiring harnesses simplify trouble shooting to make field servicing a practical reality. Without removing the shroud, there's easy access to the tally light switch, back focus adjustment lock, circuit breakers, and pattern projector color levels and chart positioning.



Production guesswork is gone. Focal length and aperture are reported through viewports in the lens shrouds or via LED indicators. (Combine this with Fujinon's microprocessor-controlled shot boxes for unerring production control.) Zoom speed control is smoother and ramping can be avoided completely by limiting the zoom range to match lighting levels. You can also see if an extender is deployed and which one. And deploy extenders from a remote demand unit, shot box or manually from the lens itself.

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Powering portable production

By F. Kurt Shafer

The selection and care of batteries are matters not to be discharged lightly.

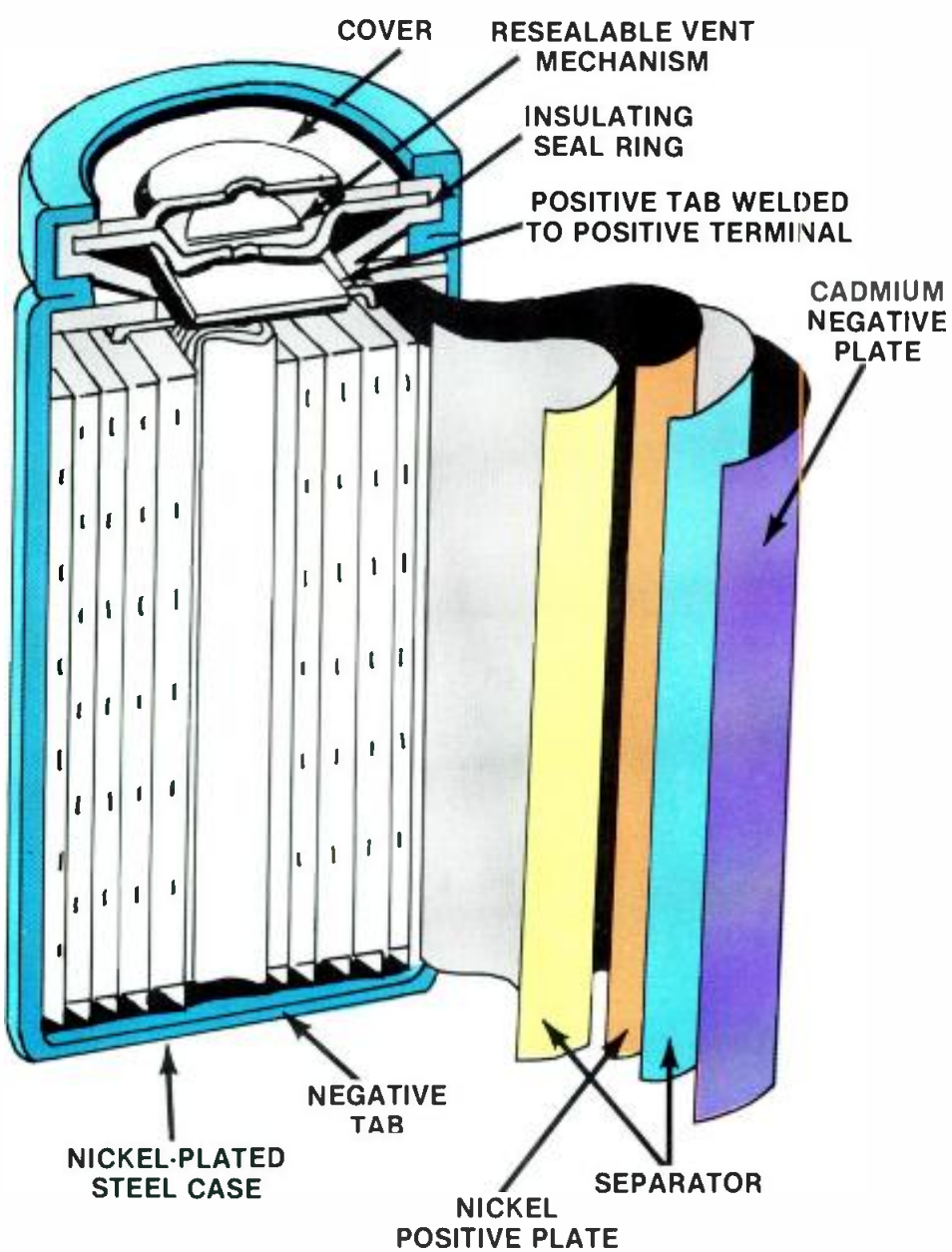

Figure 1. 1.2V, 4Ah nickel-cadmium D cell.

Batteries—the subject elicits responses ranging from apathy to intense interest, from joy to rage. Consider this scenario: You're on assignment, precariously positioned to catch a shot of a heroic firefighter rescuing a small child. Suddenly, without warning, your camera and recorder go dead. Now you know the importance of reliable portable power.

Whether the battery will work depends on the care and attention given to it on a daily basis, as well as the type of battery you select for a particular application. Of the battery types (nickel-cadmium, lead-acid, silver-zinc, lithium and alkaline), which technology is best? Each has good and bad characteristics for particular uses.

Why rechargeables?

Equipment portability requires battery power. The battery preferred for a particular piece of equipment is determined by the manufacturer early in the design phase, based on voltage, power drain during use and battery cost. Portable lights, for instance, take hundreds of watts. Cameras, recorders and portable radio systems also require a large amount of power. Non-rechargeable *primary* batteries would be depleted in minutes or hours and would be much too expensive to replace as often as needed. The economical solution, then, is to use rechargeable *secondary* batteries instead.

Rechargeable batteries have been part of the broadcast industry for years. Cameras, recorders, lights, RPU transmitters and other equipment have been powered by devices ranging from small battery packs that attach to or plug into the equipment to larger packs

Shafer is sales director for The Energy Source, Manhattan Beach, CA. He was formerly with Christie Electric.

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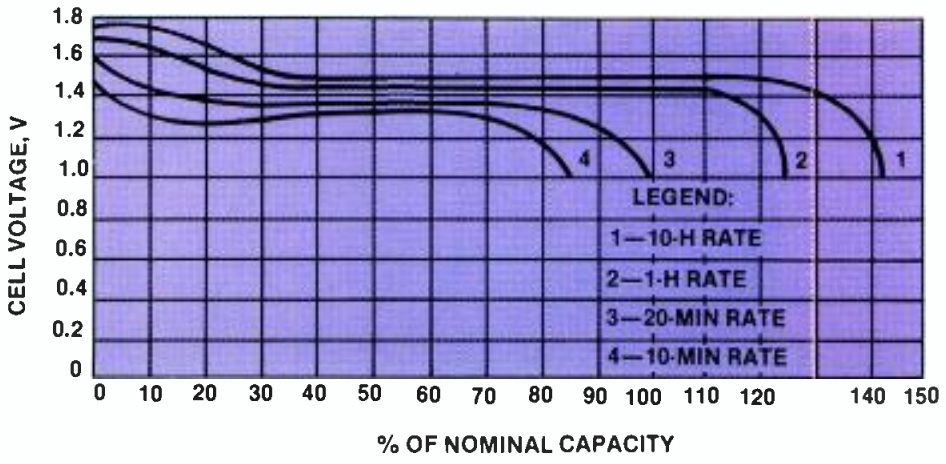

Figure 2. Silver-zinc discharge curve for various discharge rates.

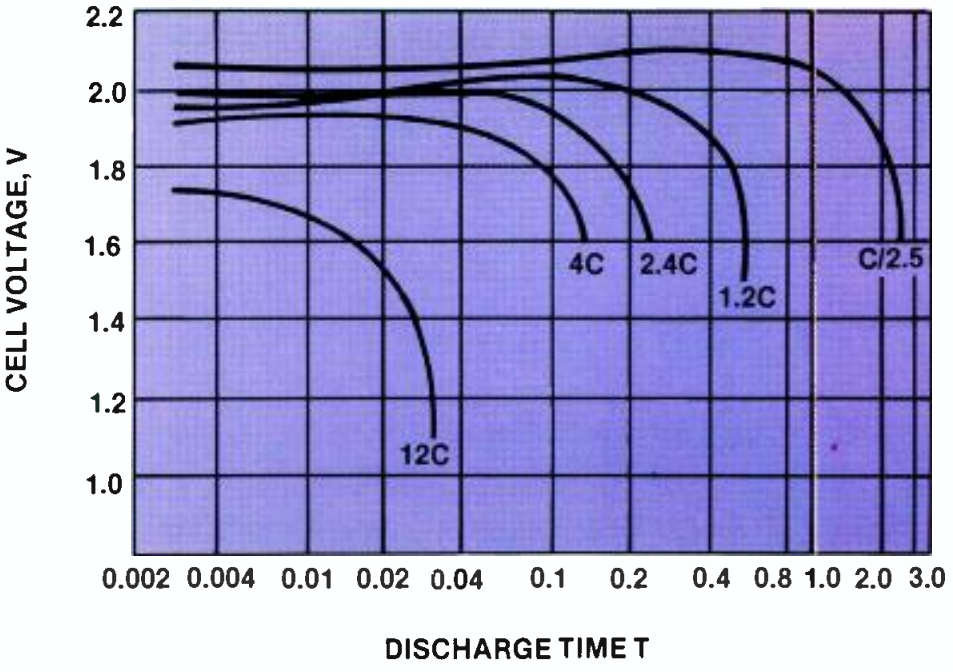

Figure 3. Lead-acid discharge curve for various discharge rates.

that bolt on. Battery belts and portable "lunch pail" batteries have met demands for higher voltages and longer running times.

An array of rechargeable battery chemistries have received attention from battery technologists. Zinc-chloride, aluminum-sulfide, sodium-sulfur, sodium beta-alumina, lithium, lithium-sulfur dioxide, lithium-metal sulfide, nickel-hydrogen, nickel-zinc and nickel-iron are among the combinations of metals and chemicals under consideration to optimize rechargeability for various applications.

Three secondary battery technologies—lead-acid, nickel-cadmium (NiCad) and silver-zinc (AgZn)—have proved useful for broadcast purposes based on price, availability and performance. The characteristics of each type determine why one type of battery might be selected for a particular need. Understanding the operating parameters, proper methods of charging, discharging, storage and maintenance will help to achieve the longest useful lifetime of each technology.

Building blocks

All power packs and belts have one thing in common. They consist of cells, usually 10, 11, 12, 22 or 24, wired in series to achieve a desired voltage. Cells are the building blocks of battery packs. Figure 1 is a cutaway view of a single NiCad "D" cell. It is rated 1.2V, with a 4Ah *(ampere-hour)* capacity. A similarly sized AgZn cell is rated 1.5V, 12Ah capacity. Lead-acid batteries usually are multiple-cell assemblies, housed in a convenient 1-piece molded case, with three, six or more cells to produce 6V, 12V or more, respectively.

Note that this discussion is about *sealed* cells and batteries. They are not absolutely sealed but, rather, have vent systems that remain tightly closed under normal operating conditions. When internal pressures build above normal, the vents open long enough to relieve the pressure, then reseal.

Venting for NiCads occurs at fairly high pressures, usually if overcharging or high discharge rates cause overheating. Lower pressure venting for lead-acid units allows hydrogen gas to escape during charging. AgZn cells have a vent pressure of about one atmosphere.

Battery amp-hour ratings

The ampere-hour rating of individual cells and battery assemblies is a measure of the amount of current the battery can deliver to a load in a specific time period. The *C rate of discharge* is the current flow to deplete the total capacity of the cell in one hour. For example, a 4Ah cell has a C rate of 4A. At the end of the hour, all cells within the battery exhibit a specified discharge potential.

The cell capacity sometimes is rated at a discharge current much lower than the C rate, which may be misleading for broadcast applications. Lead-acid batteries are rated *C/20*, a discharge current equal to $\frac{1}{20}$ of the C rate. Discharged at the C rate, the lead-acid capacity is less than it would be if the drain were at the C/20 rate. A 12V, 4Ah lead-acid battery provides only about 2.5Ah when powering a 25W load, or about 37% less than the rating implies. The 4Ah capacity is valid (C rate = 4A) only if discharged at a C/20 rate (0.2A). Figures 2, 3, and 4 show typical discharge curves for AgZn, lead-acid and NiCad units, respectively.

NiCad and AgZn batteries have more useful capacity than lead-acid at high rates of discharge. NiCad cells usually are rated at a C/5 rate, so a 4Ah NiCad battery at the C/5 rate provides 3.8Ah into a 25W load, a reduction in capacity of only 5%. AgZn has similar discharge characteristics. Because the capacity of AgZn cells is about three times higher than that of the same size NiCad, a 25W camera load (2A at 12V) is a smaller percentage of the AgZn capacity rating. The battery actually supplies more than its rating implies.

Size and weight vs. capacity

In terms of physical size of the battery technologies, AgZn batteries are three times more powerful than NiCads of the same size. NiCads are more powerful than lead-acid types, but by a slimmer margin.

Because Ah capacity is dependent upon load, especially with lead-acid types, you must define the load before making comparisons. For example, with a 25W load, NiCad delivers 32% more power than a lead-acid unit of the same rating. At lighter loads, the difference is less. But, in general, for the same load, a higher-rated lead-acid battery is needed for the same running time as a NiCad unit.

Figure 5 plots volumes in cubic inches and power capacity (total capacity depleted in one hour) for typical NiCad and lead-acid batteries for small portable applications. The

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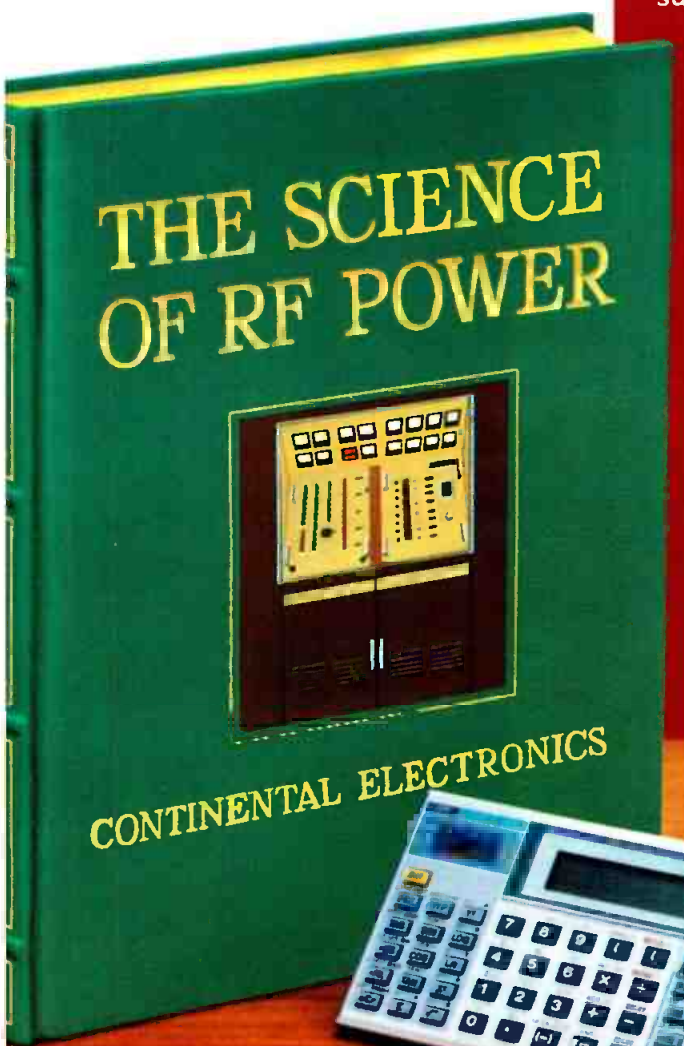

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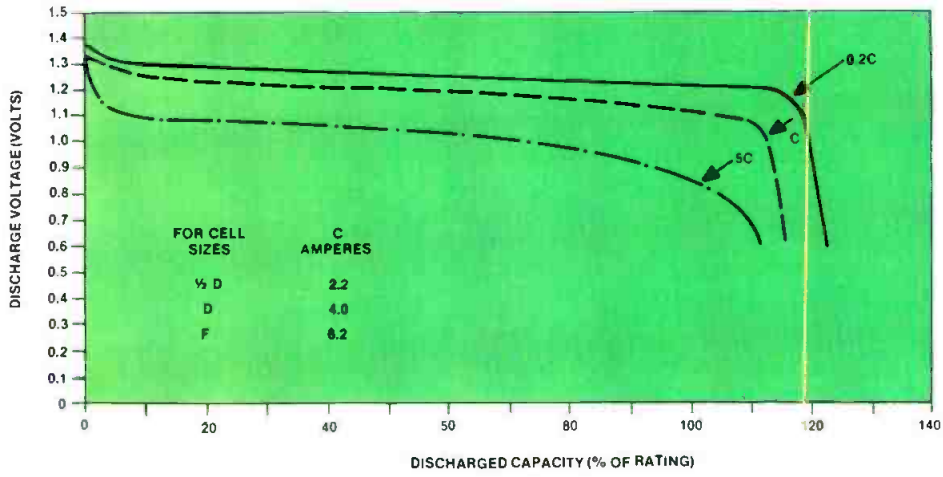

Figure 4. NiCad discharge curve for various discharge rates.

12V, 4Ah NiCad and the 12V, 4Ah lead-acid assemblies are nearly identical in volume, but lead-acid provides 30W, compared with 45.6W for NiCad. The same power from lead-acid requires a 6Ah rating.

Weight varies with battery technologies as well. AgZn leads again, with nearly three times the capacity of NiCad for the same weight. A 13.5 V, 12Ah, AgZn pack weighs 4.25 pounds. A 13.2V, 4Ah NiCad pack weighs 4.5 pounds. Lead-acid batteries are about the same weight as NiCads for similar ratings. To compare equivalent capacities, you must use a larger lead-acid battery.

Battery longevity

The expected lifetime is the number of discharge-recharge cycles possible before the capacity of the battery is reduced to 50% to 60% of its original capacity. Actual lifetime depends upon the depth of discharge (DOD) the battery experiences during the cycles.

In broadcast field use, the discharge may vary from shallow to 100% discharge. It is common to run a battery pack until it is discharged completely. The camera and recorder give a warning when the battery voltage is low and stop running if the pack is not replaced. When used until the warning occurs, batteries often reach 100% discharge.

Figures 6 and 7 show life vs. depth of discharge for lead-acid and NiCad units, respectively. Based on 100% DOD, the suggested life is about 150 to 200 cycles for lead-acid batteries, more than 500 cycles for NiCad and 100 cycles for AgZn.

If you can control the depth of discharge, you can extend the life of battery packs. However, discharging a lead-acid battery to 50% DOD in hopes of achieving a 400-cycle lifetime doesn't work. You would need to double the size and Ah rating to get the same useful power as from a NiCad battery.

The cost of power

The *lifetime cost* of each technology can be predicted in almost the same way as the cost for electricity in the home—in cents per watt-hour (Wh) obtained over the life of the product. Multiplying the load (watts) by the operating time (hours) with that load and the number of charge-discharge cycles yields

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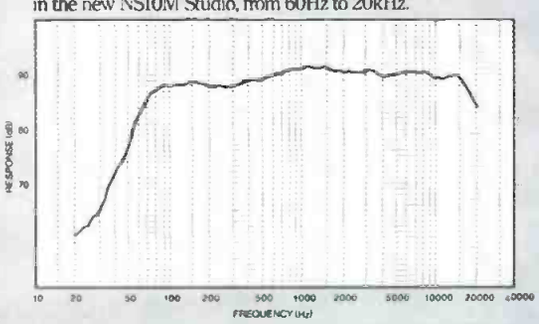

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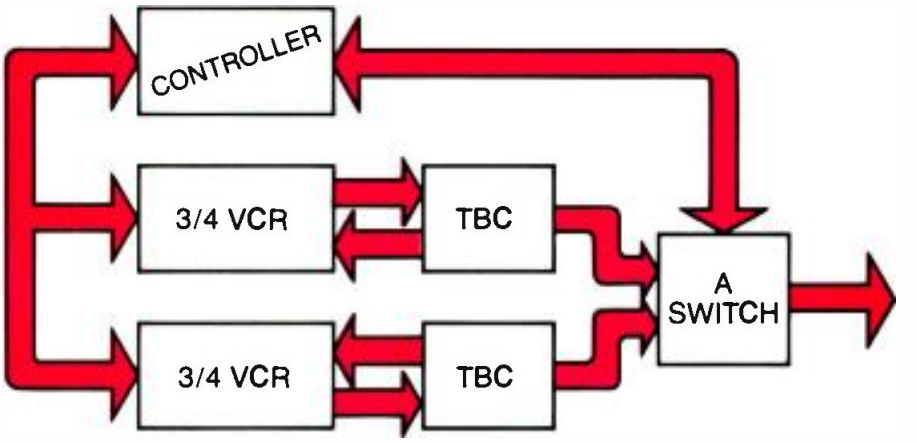

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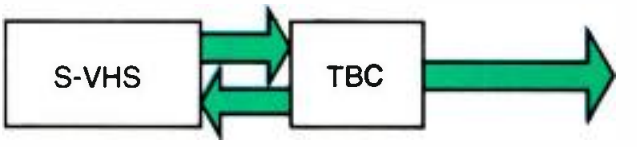

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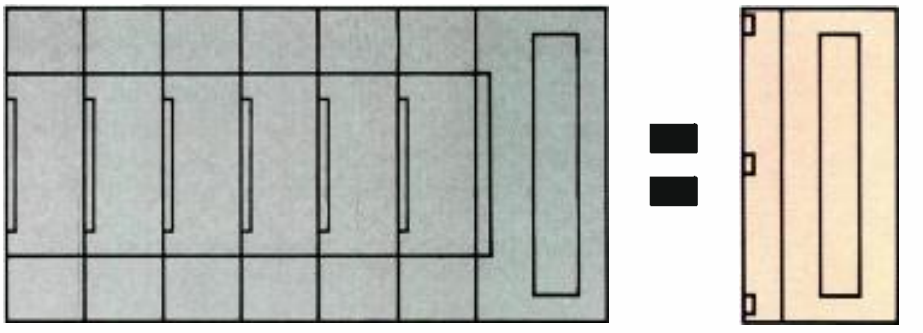

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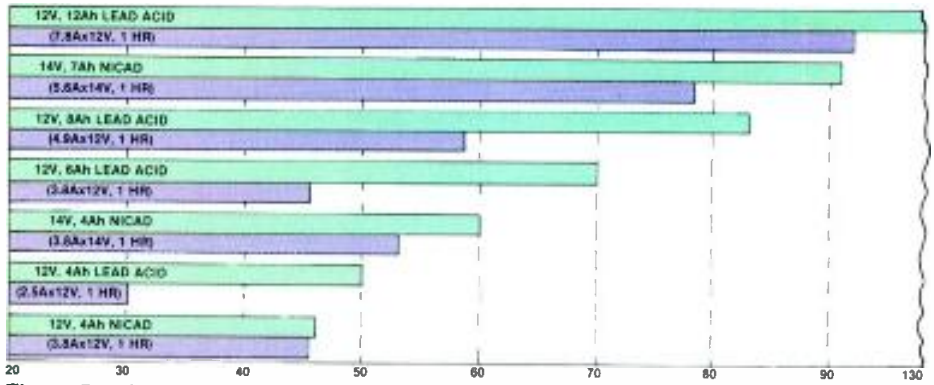

Figure 5. Volumes and power capacity for NiCad and sealed lead-acid units.

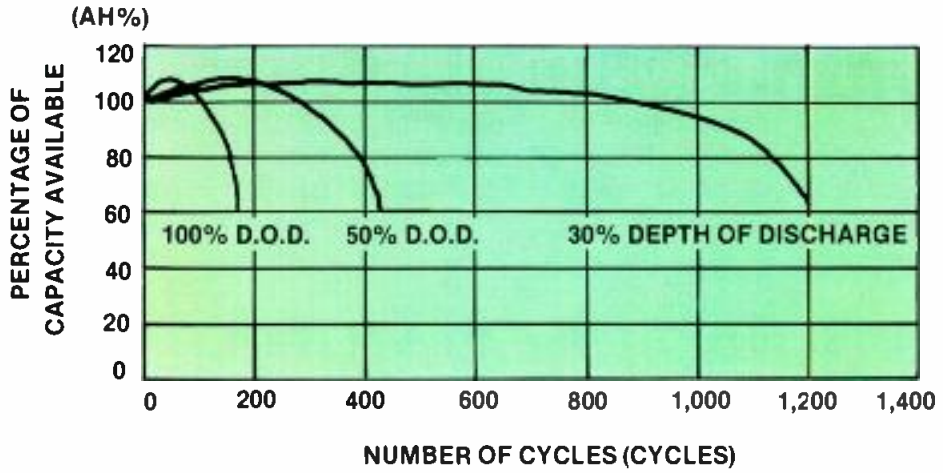

Figure 6. Lead-acid depth of discharge (DOD) vs. life.

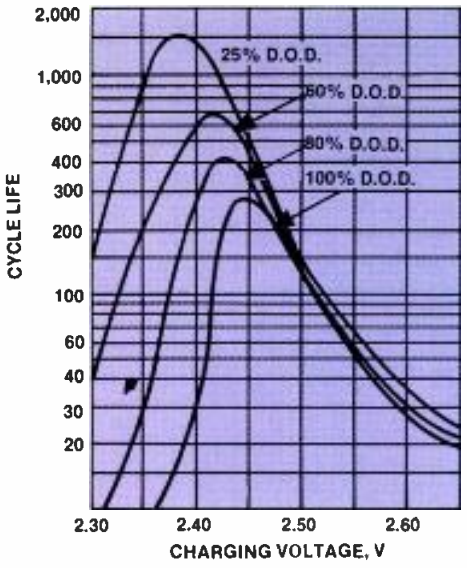

Figure 7. NiCad DOD vs. life.

Continued from page 64

undergone improvements and now are more compact, easier to use and less temperamental. The difference in power-to-size ratio is less than at any previous time, but nickel-cadmium technology reduced size and weight to a minimum 10 years ago. It remains true that only NiCads can pack a useful 4Ah capacity into an industry-standardized 14V quick-attach, brick-type pack for cameras.

NiCads offer nearly three times the operating lifetime of lead-acid batteries under the same conditions. If you use batteries on a daily basis, you probably will prefer to pay more up front to get more lifetime. The occasional user who doesn't mind replacing battery packs or belts more often may prefer lead-acid batteries.

On the other hand, both chemistries have quirks that may cause headaches in some applications.

Operating temperature

Figures 8 and 9 show available capacity vs. temperature for lead-acid and NiCad batteries. Both types drop significantly in capacity at low temperatures. The capacity of NiCad, discharged at the C rate, drops 10% when the temperature drops to 0°C. The drop is greater at higher discharge rates. At 3C, capacity is 30% less at 0°C. The lead-acid battery is no better, because at the C rate of discharge capacity drops 18% for a temperature drop to 0°C.

Memory

NiCad cells may exhibit an effect called *memory*, which, fortunately, is a reversible condition. Figure 10 shows that after repeated cycles of discharge for one hour at the C/5 rate, the output voltage of the cell drops by more than 0.1V. (A specific, repetitive discharge rate and time are key words here.) In a pack of 12 to 24 cells, a reduction of output voltage by 1.2V to 2.4V causes premature low-voltage indications.

Figure 11 shows the voltage reduction and voltage *step* caused by repeatediy overcharging at the C/10 rate. This, like the memory effect, is reversible. The battery must be discharged fully (to 1V/cell), then recharged completely without overcharging. Repeating the process three times should restore the battery capacity.

Note that the memory phenomenon may not affect equipment or performance, if 13.2V–14.4V NiCad packs are used to power 12V systems. Memory effects do not occur with lead-acid or AgZn cells.

Cell reversal, overdischarge and self-discharge

Lead-acid or NiCad batteries may exhibit a cell potential reversal during discharge. This happens to the cell that reaches full discharge (1V/cell) first, if the entire pack continues to discharge. Most cells can withstand some reversal, but if the discharge is repeated often at high current drains, as is common in belt packs, permanent damage to the cell can occur, and total failure results. To prevent this problem, avoid discharging a NiCad pack below 1V/cell.

Figure 12 shows the acceptable discharge voltage of a lead-acid battery. As a rule of thumb, discharge should be kept above 1.5V/cell or 9V on a 12V battery. Discharge below the bottom curve shown in Figure 12 can cause irreversible damage. When overdischarged, the electrolyte can become pure water, making recharging difficult. If the battery is left discharged for any length of time, *sulfation* occurs. (Lead sulfate on plate surfaces goes into solution.) Then, when the battery is recharged, crystalline metallic lead can link between plates to form short circuits that constitute a permanent failure.

Self-discharge is a little-understood phenomenon in NiCad and lead-acid units. Figure 13 plots storage time of lead-acid batteries vs. ambient temperature. In general, lead-acid will self-discharge about 10% every three months at 20°C. Lead-acid batteries must be recharged before being completely self-discharged to prevent permanent damage and reduced life.

NiCads exhibit a non-linear capacity loss during storage (see Figure 14). At 20°C, a typical NiCad loses 20% of charge the first month, 40% over three months and 50% within six months. If the temperature is 10°C higher, 80% of the charge will be gone in four months.

In contrast, NiCad batteries can be stored

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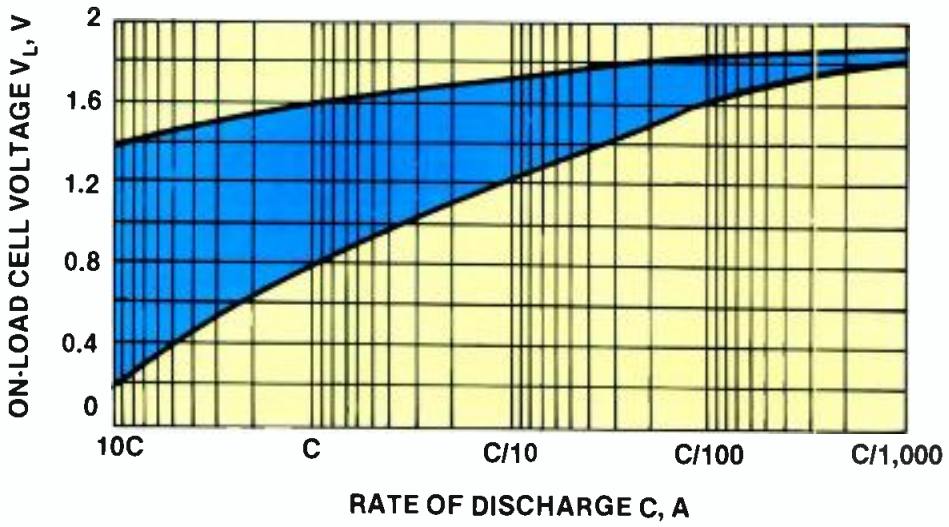

Figure 12. Lead-acid acceptable DOD rates.

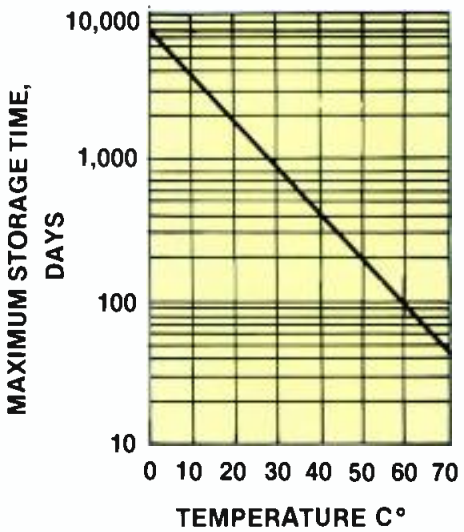

Figure 13. Lead-acid self-discharge time vs. temperature.

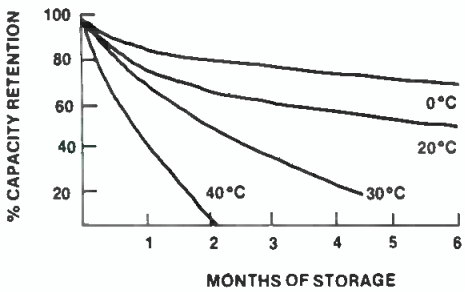

Figure 14. NiCad capacity loss during storage.

heating the cells or overcharging the battery. The use of a microprocessor-based system allows a variety of added features, such as *multiple-channel* charging and status reporting. Most multiple-channel systems work sequentially, completing the charge on one before moving to the next.

Simultaneous charging of multiple batteries requires a greater power-supply capacity with multiple regulation and control circuits on the charger. Chargers with discharge and analyze capabilities are now available with power capacity to fast charge five 14V, 4Ah NiCad batteries simultaneously.

Multiple-channel chargers introduce a factor of convenience for any battery-intensive facility, particularly one in which a variety of different battery sizes and types must be up to par at all times. Under microprocessor control, the system deals with fast or slow charge of any combination of 12, 13 or 14V quick-attach and VTR battery packs. The controller of some models can automatically identify the size and voltage of each battery attached to the system and, in some cases, select a charge routine for each device. In the fast-charge mode, the process requires about an hour per battery. Also, the controller monitors each battery that remains connected, activating the charge circuit only if a drop from the fully charged condition is found.

Information about the charging process is provided with LEDs and an LCD display. As battery requirements change, new PROMs for different charging routine requirements can be placed into the system controller.

Similar convenience is possible for efficient, unattended charging of multiple batteries with a single-channel charger and add-on sequencer. Such units perform automatic fast or slow charge to a combination of battery packs in specific voltage and capacity ranges. For example, one model might charge 10V to 15V packs with capacities from 2Ah to 12Ah. Another is designed for 12V to 30V packs or belts in the same capacities. Other features, such as a program to recondition older and abused batteries, can be totally automatic.

Under computer control, a total battery care system can include charger, discharger, analyzer and reconditioner functions in a single package. The unit automatically processes any combination of battery packs, belts or assemblies of any technology, because it can recognize which battery type is connected in order to select the appropriate routine. Programmability simplifies handling of special situations. For example, a sequential charge at any current to 10A and at any voltage to 78V, or simultaneous charging (at a slower rate) on all channels, is possible.

Different battery chemistries require different charge methods, so the system is programmable for a constant current, constant voltage or *reflex* mode. The reflex concept is a patented system for NiCad batteries that combines a pulsed charging current with frequent discharge pulses to dissipate gas formation on battery plates.

To *analyze* a battery, the pack is charged fully, then discharged at the C rate constant current for the amount of time needed to reduce its output voltage to about 1V/cell. A 4Ah pack should discharge in about one hour at 4A. The 1V/cell end voltage normally is used, because it is low enough to indicate a nearly totally discharged cell, but is high enough to avoid reversing any cell in the assembly. The result of this test is an ampere-hour capacity value for the battery pack. If the capacity is less than a new battery, but more than 50% of the rating of a new pack, the battery should react favorably to reconditioning.

For analysis, control includes different discharge rates internally or through add-on discharge loads. One analysis routine includes discharge, recharge and display of the Ah capacity found during the discharge. A second routine charges, discharges, charges, then displays the capacity.

Reconditioning of NiCads to remove memory effects includes discharging (to 1V/cell) and recharging three times automatically, with displays of the capacity in Ah. Because NiCad cells heat up more during discharge than during charge, reconditioning cycles must include cooling periods. The display allows a user to inspect preprogrammed routines and to add or delete programs for other batteries.

The charger systems with analyzer and reconditioner functions on the market work well for their intended purpose. Before buying a system, however, ensure that it will deal with your specific needs. Remember that belts, packs and different chemistries have different requirements. For example, automatic identification of a conventional battery is not possible. It must be done by the operator. However, some *future* premium cell assemblies may include an identification device in the pack.

Maintaining batteries

An AgZn battery pack requires little maintenance. You should handle packs carefully, storing and shipping them in an upright position. If you decide to use AgZn to take advantage of the high power available in such a small size, it is likely that the battery will get frequent use. If used once a day, it will last

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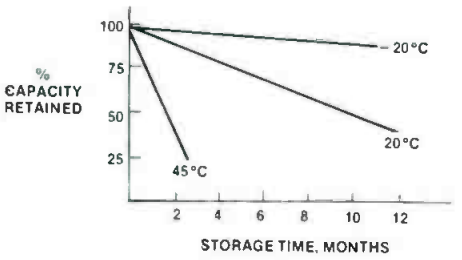

Figure 15. Silver-zinc capacity vs. time.

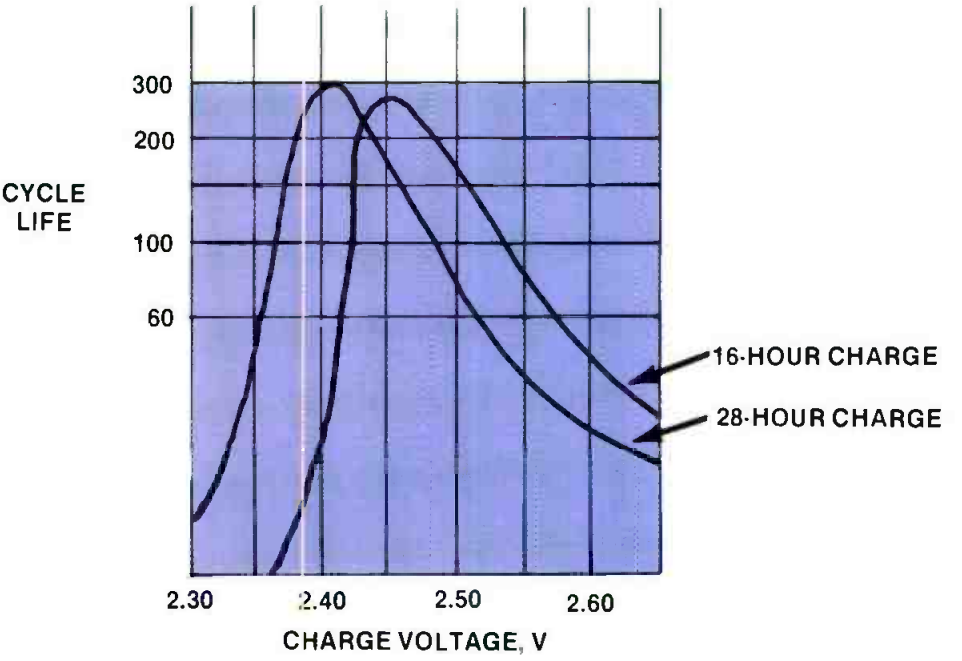

Figure 16. Lead-acid cycle life vs. charge volts.

only four months, according to cycle count. Experience has shown that lives from nine months to more than a year are common. The right charger and proper handling procedures are important.

Sealed lead-acid batteries require no maintenance beyond proper handling and cannot be reconditioned. The primary failure mode is growth of the positive plate, which is accelerated by temperature and is irreversible. Proper charging, as discussed previously, is essential.

Beyond reconditioning, little can be done to maintain a NiCad pack or belt other than careful handling and proper charging. The primary cause of cell failure is heat, so storage, transportation and use should minimize the amount of time the assembly experiences temperatures higher than 30°C.

If a pack loses capacity and does not respond to reconditioning, one or more cells may have shorted internally. Another possibility is a deteriorating separator, allowing rapid self-discharge. For this reason, replacing only shorted cells may not repair the pack.

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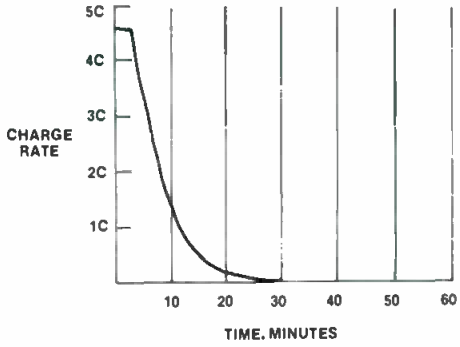

Figure 17. Lead-acid fast charge rate vs. charge time.

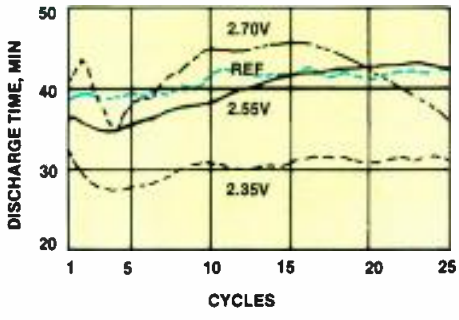

Figure 18. Lead-acid discharge time vs. charge voltage.

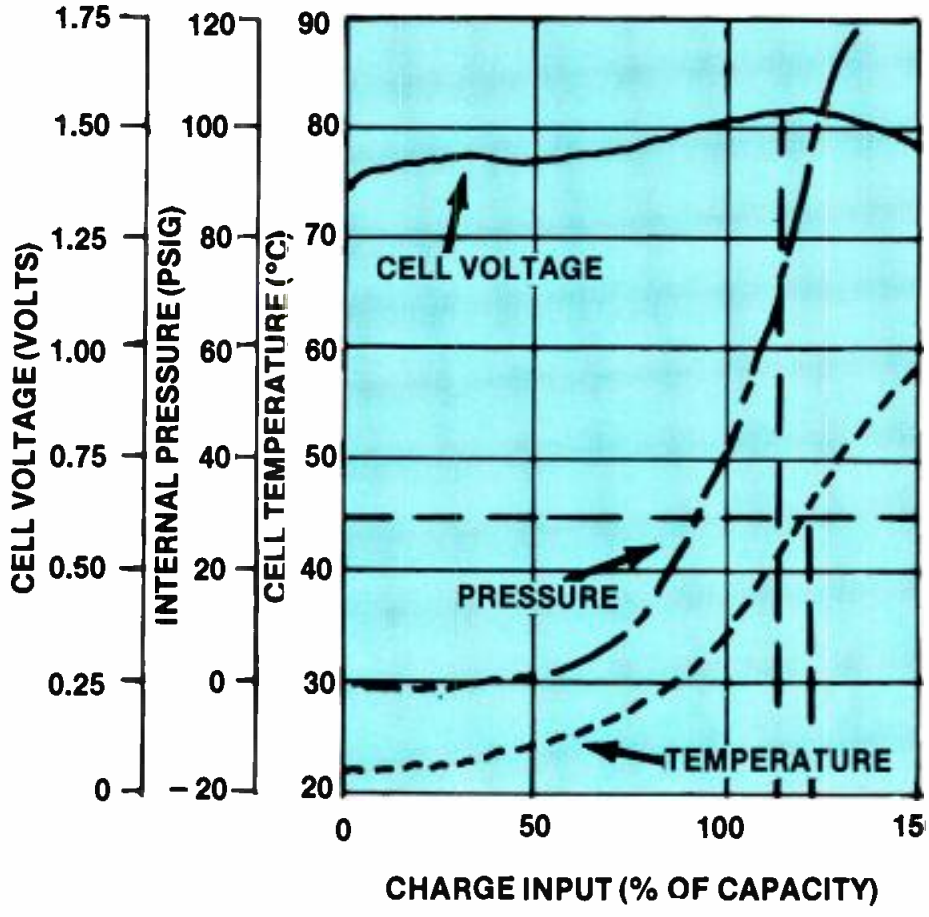

Figure 19. NiCad curves of temperature, voltage and pressure during charge.

New technology

Battery manufacturers continue to improve existing technologies and to develop new and better batteries. Small advances have been made with NiCads, in the form of slightly higher capacities in the standard-size packages. One recent achievement was increasing the rating of a 1.5Ah pack to 1.7Ah. Both packs involved use of a 10 *sub-C* NiCad cells. Also, a 4.5Ah quick-attach pack has been announced. It uses a new NiCad design that puts a little more capacity into a standard D cell.

One manufacturer plans a rectangular NiCad cell, which would allow tighter packaging for a slightly improved power-to-size ratio. However, the AgZn chemistry is still the leader in power to weight. Witness the fact that it was the battery selected for the $3 million solar car developed by General Motors and Paul MacCready. That car won the World Solar Challenge in November 1987 in Australia.

Lithium is the hottest new technology, but still is not viable for the size and power requirements in broadcast applications. It is not known at this time if lithium will ever be cost-effective at high power levels.

For many reasons, NiCad battery packs and belts have been the technology of choice in broadcasting. A tremendous amount of work has been done by vendors of packs and belts to make the products easy to use and charge. Various systems are available to analyze and recondition virtually any NiCad battery pack or belt in use today.

No matter how much development goes into battery technology, however, the well-being of battery products in the user's facility is more dependent on the treatment they receive. As with other electronic equipment, batteries do not respond well to physical abuse or improper care. If treated with respect, however, your portable power equipment should achieve the suggested life without problems.

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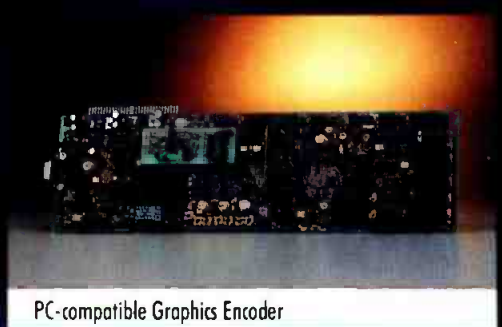

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Stereo microphone techniques

By Stephen Toback

You don't need a truck full of microphones to provide mono-compatible stereo audio.

The day has arrived when just clamping an old microphone on the mini-cam won't cut it anymore. Stereo can provide great sound, but it requires microphone techniques. The microphone, once an added chore to be handled at the last minute, is now an integral part of video production. Placing microphones properly is not only important for obtaining quality stereo sound, but also is imperative for mono compatibility.

Toback is majoring in music engineering technology at the University of Miami, Coral Gables, FL.

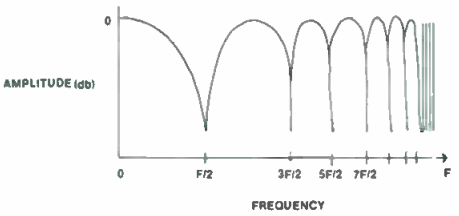

Figure 1. Comb filtering is the primary cause of signal cancellation when two audio channels are summed.

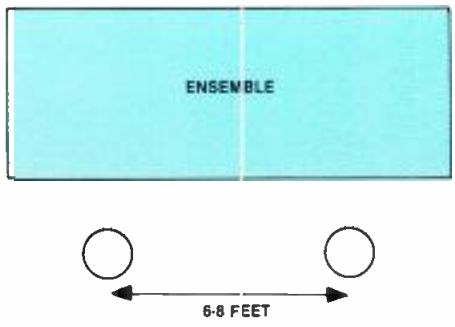

Figure 2. The spaced microphone technique is simple, but often produces comb filtering.

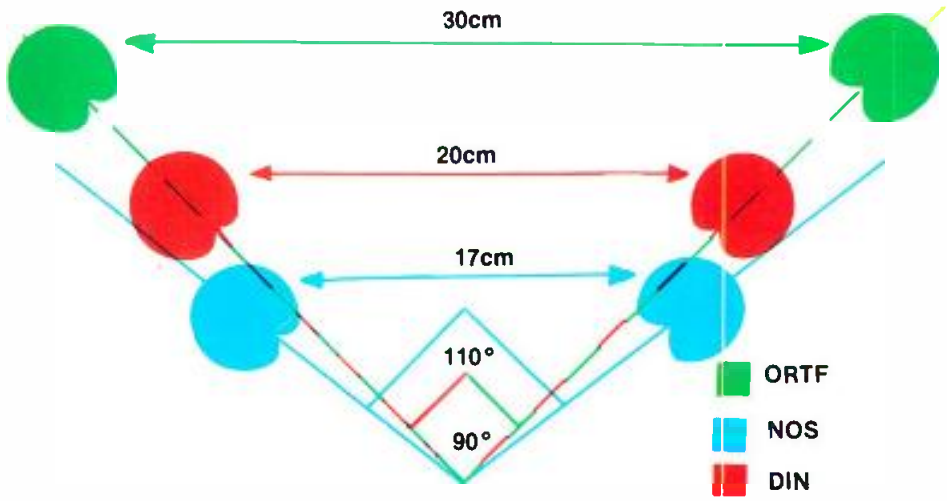

Figure 3. The European standards—ORTF, NOS and DIN—all use similar mic placement.

To fully understand the anomalies that may result from summing a stereo signal to mono, we must first take a brief look at how the brain perceives direction. The brain determines the direction of a sound by comparing the differences between the sound received by the two ears, based on four main localization cues:

- *Time.* The brain locates the sound to the ear that receives the sound first.
- *Amplitude.* The sound will be louder in the ear closest to the sound because the physical mass of the head will attenuate the signal before it reaches the opposite ear.
- *Complexity of the frequency spectrum.* The ear facing the signal will receive the most complex frequency spectrum because the hair and the curves of the face will tend to filter the sound. This absorbs the high frequencies before the sound reaches the opposite ear.
- *Phase differences.* The time delays, introduced because of the size of the head, also result in a phase shift between the ears.

All stereo microphone techniques use one or a combination of these cues to provide the localization information.

Mono compatible

Those techniques that derive all or part of their stereo information from time differences are not mono compatible. Arrival time delays of a signal between two

Continued on page 84

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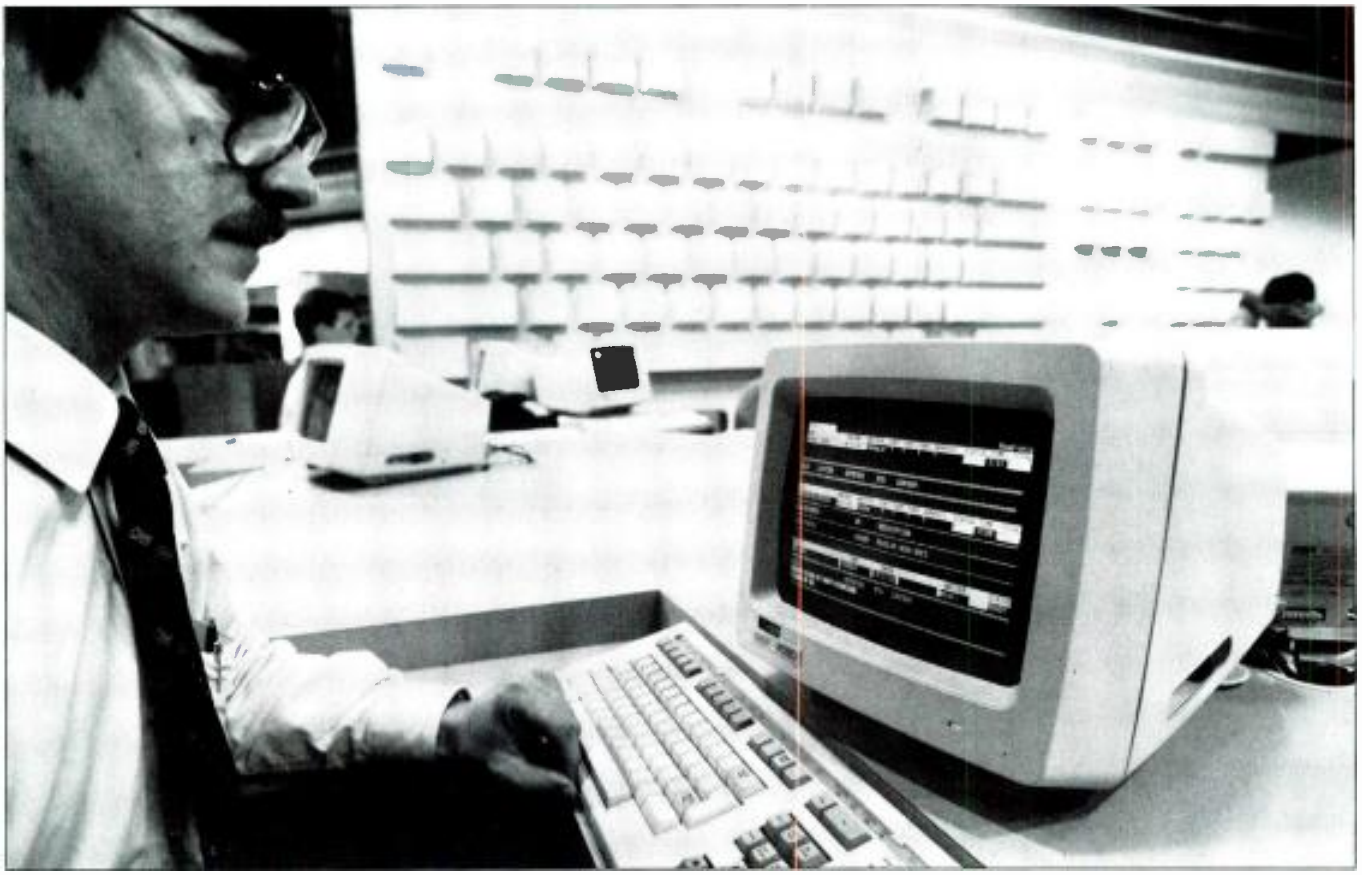

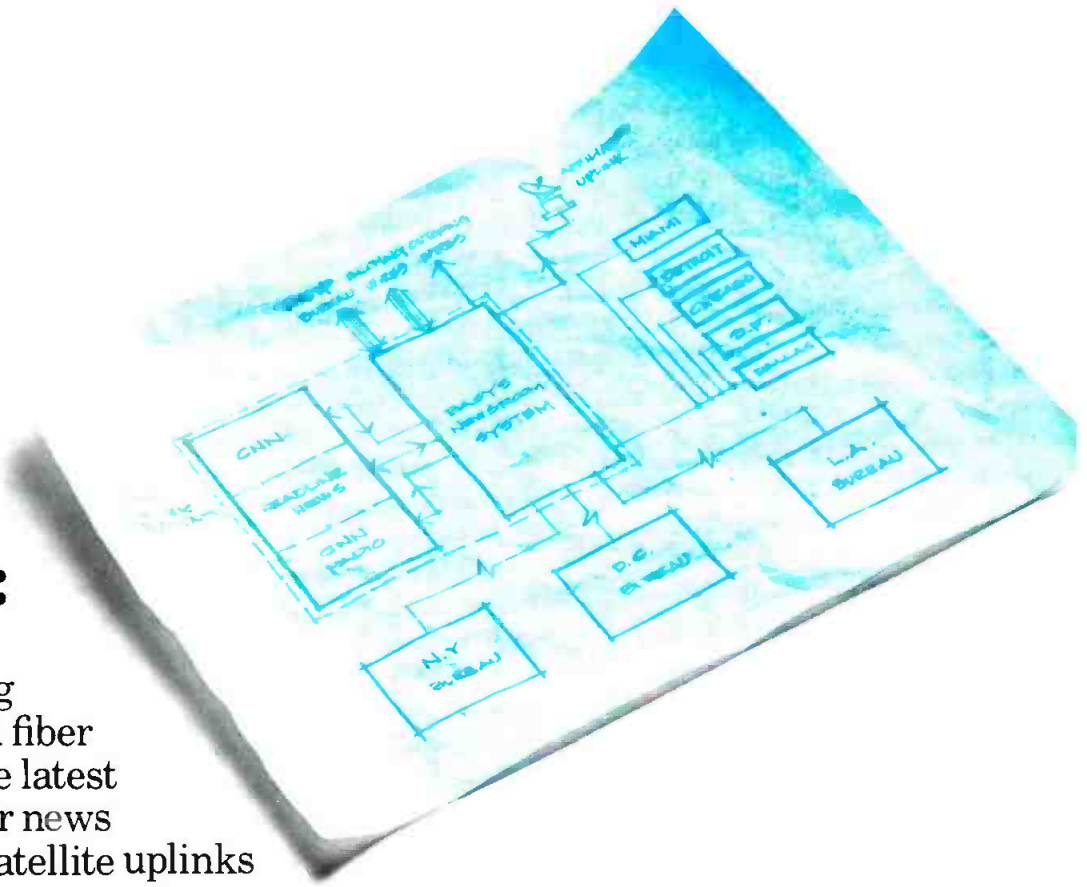

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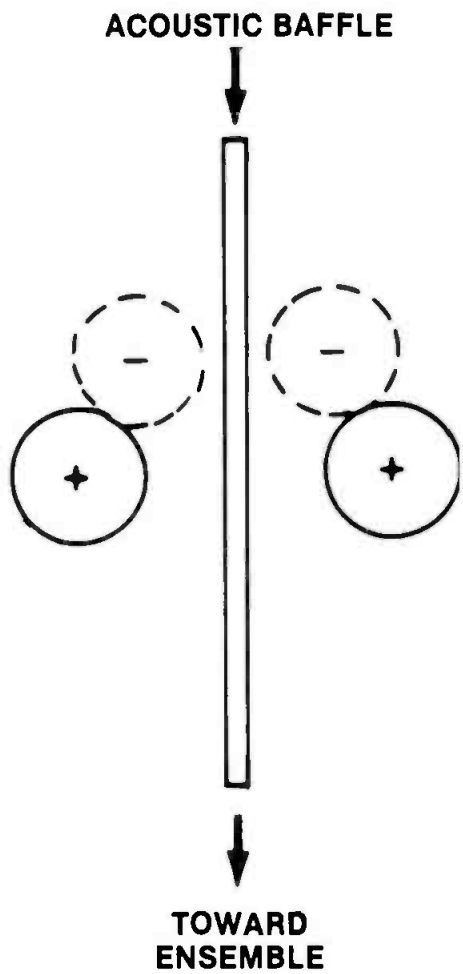

Figure 4. Masden helped reduce the problem of high-frequency time delay by placing an acoustic baffle between two bidirectional microphones.

Continued from page 80

tween the information recorded on the left channel and the information recorded on the right channel. These out-of-phase signals result in cancellations, reinforcements or some frequency spectrum distortion, when the two microphone outputs are summed to mono. This effect is known as comb filtering (see Figure 1) and can create a severely distorted mono signal.

If the microphones are D distance apart, the time delay becomes: D/c, where c equals the speed of sound through air—1,130ft/s. The first frequency where cancellations can occur is determined by the formula: f=c/D, with initial cancellation at f/2. Additional cancellations occur at 3f/2, 5f/2, 7f/2, and so on.

For microphones placed six feet apart, for example, cancellations occur at 91Hz, 273Hz, 455Hz, etc. The signal does not completely cancel because the program material is composed of complex audio waveforms and not simple sine waves. Severe attenuation will oc-

Continued on page 88

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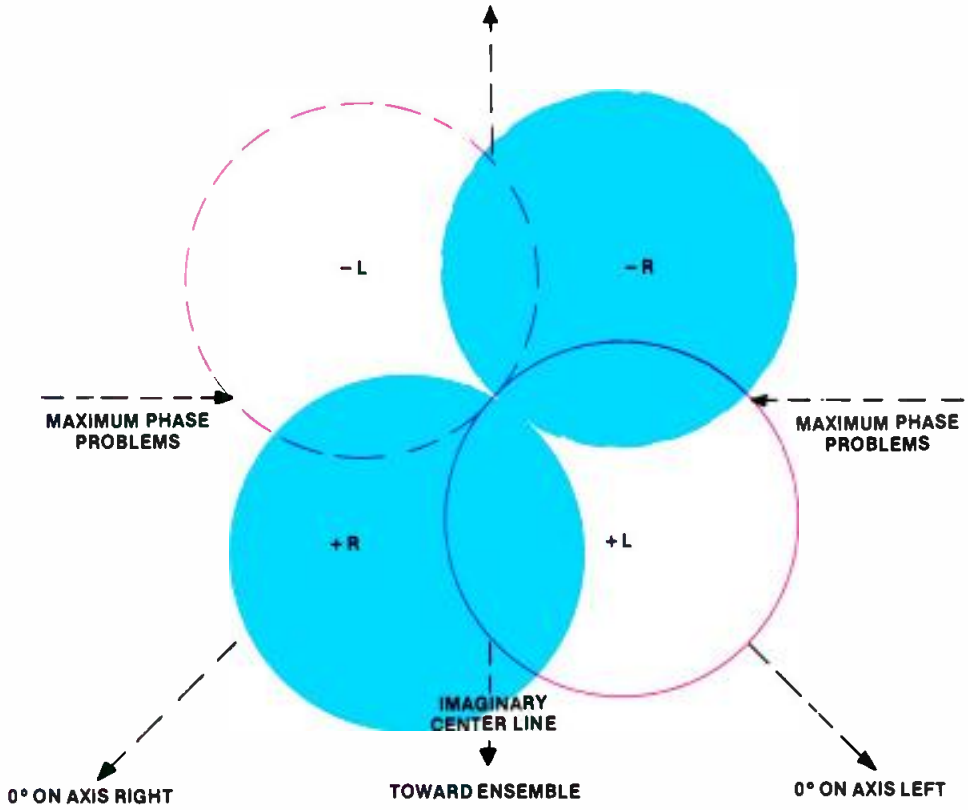

Figure 5. Blumlien's technique relies on two closely spaced bidirectional microphones.

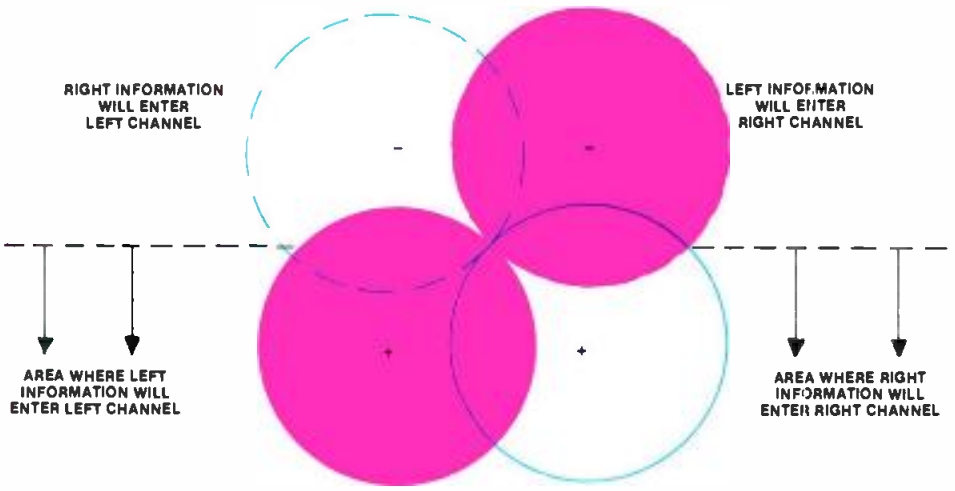

Figure 6a. Crossed bidirectional microphones deliver a useful frontal lobe of only 90°.

Continued from page 84

cur, however, near these frequencies. The same is true with reinforcements of the signal, which will take place near the frequencies 2f, 3f, 4f, etc.

Only those microphone techniques that derive their stereo information from pure amplitude differences can be called completely mono compatible. These differences in intensity do not cause problems when the two separate channels are summed.

Non-compatible techniques

The spaced microphone technique derives its directional information from time and intensity differences. In this technique, two microphones are placed six to eight feet apart in front and center of the ensemble (see Figure 2). Omnidirectional microphones usually are used to gain the warmth of the hall, but any microphone may be used. However, because directional cues are being sensed by means of time delays on the order of 5μs to 7μs, severe comb filtering will occur beginning as low as 150Hz, when the left and right channels are summed to mono.

This technique provides an additional problem in reproduction. Unless the speakers are placed precisely the same distance apart as the microphones, the time and intensity information will not be reproduced accurately, and a reduction in the stereo image quality will result. Because many consumer stereo televisions have speakers built into the console placing the speakers much closer than the six to eight feet required, the original sound cannot be reproduced.

Semi-compatible techniques

The technique that uses frequency spectrum complexity or phase cues as a major source of stereo information is the binaural or dummy head technique. The principle of binaural recording attempts to mimic the manner by which the human ear receives directional information, as discussed previously. The technique relies on the use of an actual "dummy head" with two omnidirectional microphone capsules in holes where the ears would be located.

Because the technique uses two omnidirectional microphones in close proximity, time and amplitude cues are lost. Therefore, we must rely totally on the accuracy of the dummy head's approximation of a human head for the stereo image. A major problem arises because of the frequency-dependent nature of this technique. Low frequencies will diffract around the head and lose directionality. Because of the small size of the dummy head, this diffraction occurs until approximately 500Hz.

The reproduction of the signal leads to the most important problem with this technique. For binaural recording to be properly perceived, it must be listened to with headphones. It then transfers our ears to that of the dummy, and all cues are reproduced faithfully. If played back over spaced speakers, all cues are lost in the space from the speakers to our ears.

Although this technique is semi-compatible for mono use, its restrictions in reproduction limit its use to special applications where headphones may be used exclusively.

The placement of microphones with respect to each other in time has concerned broadcast engineers in Europe since the beginning of the stereo era. By placing the microphone pair at a standard distance apart, and at a standard angle, engineers were assured of consistent stereo imaging.

All the European standards for this technique are similar. The French National Broadcasting Company (ORTF: Office de Radiodiffusion-Television Francaise) places the microphone capsules 17cm apart at an angle of 110° (see Figure 3). The NOS standard (Nederlandsche Omroep Stichting) comes from the Dutch Broadcasting Organization. It places the microphones at a 90° angle and almost doubles the distance between the capsules from the previous standard,

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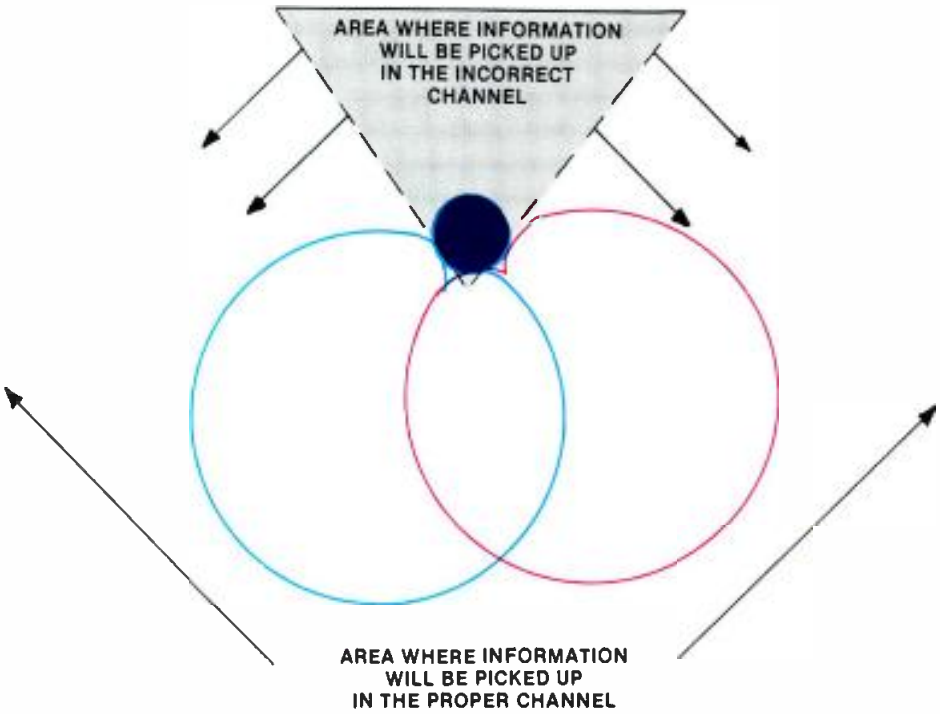

Figure 6b. *A pair of crossed hypercardioid microphones provides a pickup angle of approximately 130°.*

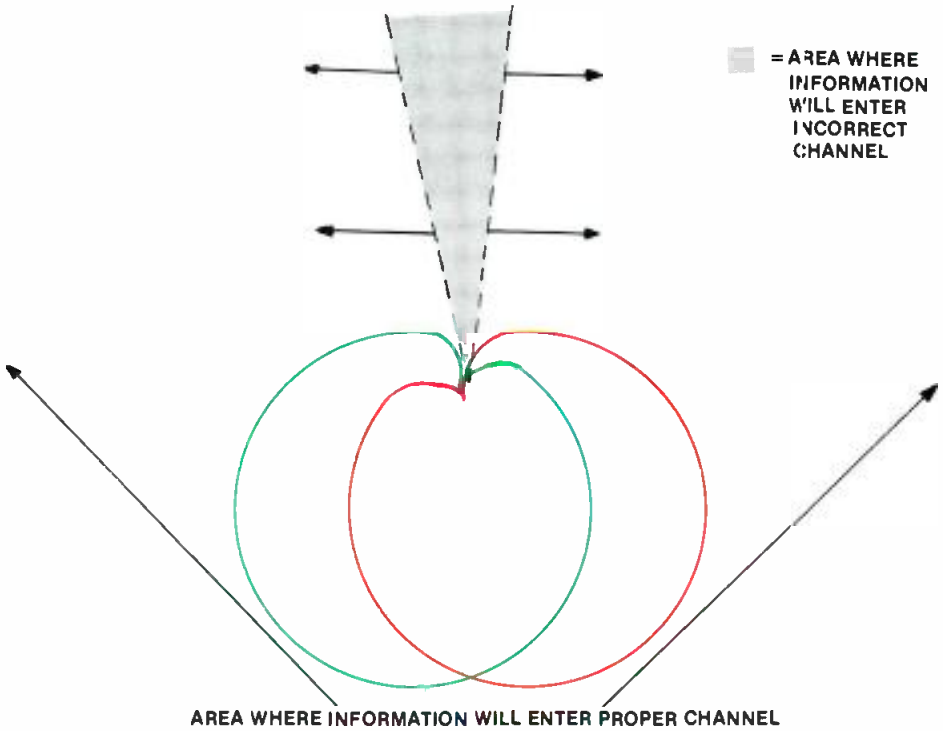

Figure 6c. *Crossed cardioid microphones further increase the frontal lobe to almost 180°.*

placing them 30 cm apart. The German standard (DIN: Deutsche Industrie-Norm) also places the microphones at a 90° angle, but it reduces the distance between the capsules to 20cm. The serious recording engineer should experiment with them and vary the placement to suit a particular taste.

These techniques are not totally free of the time-domain problems of the previous methods. For a low-frequency signal, whose wavelength is relatively large compared to the distance between the microphone capsules, the microphones are said to occupy the same point in space. Thus, for low-frequency information, all stereo cues are derived from intensity differences, making this technique mono-compatible.

A problem arises when the wavelength becomes smaller than the distance between the capsules, approximately 500Hz. Around this point, time differences become relevant to the summed mono signal. These time differentials pose the threat of creating frequency anomalies, such as comb filtering, which cancels the signals around 1,600Hz. In spite of the potential for problems, these techniques may be used successfully to achieve a good mono signal. Because much of the information in the audio band resides in the lower frequencies, problems with transient information in the higher frequencies are often more subtle.

All of the preceding techniques should be used with directional microphones because the pickup intensity will be angle-dependent and enhance the image.

A cross between this semi-coincident technique and binaural recording was developed by Masden. He invented a way to reduce the effect of time delays at high frequencies by placing two bidirectional microphones on each side of an acoustic baffle (see Figure 4). For low frequencies, all stereo cues would again come from intensity information only, because these frequencies easily diffract around the baffle, placing both microphones in the same point in time. High frequencies are unable to diffract around the baffle because of their small wavelengths. They will never reach the opposite microphone, ensuring their directionality, yet avoiding the time differences present in the preceding techniques.

Fully compatible techniques

The next logical step in the progression to mono compatibility is to place our stereo microphone pair in the same point in space and, therefore, in time. In the early 1930s in England, Alan Dower Blumlien of the old Columbia Gramaphone Company performed some of the first experiments with the coincident microphone pairs. The microphone capsules are placed so close together there are no time differences, regardless of wavelength, which will prevent frequency anomalies when the channels are summed to mono. This technique relies solely on intensity differences to provide stereo cues. When the program material is reproduced over loudspeakers, time differences are introduced to the signal from the loudspeaker placement, adding to the stereo imaging.

Blumlien's method places two bidirectional microphones on the same microphone stand with their capsules almost touching. The 0° axis of each microphone is set at a 45° angle with respect to an imaginary line perpen-

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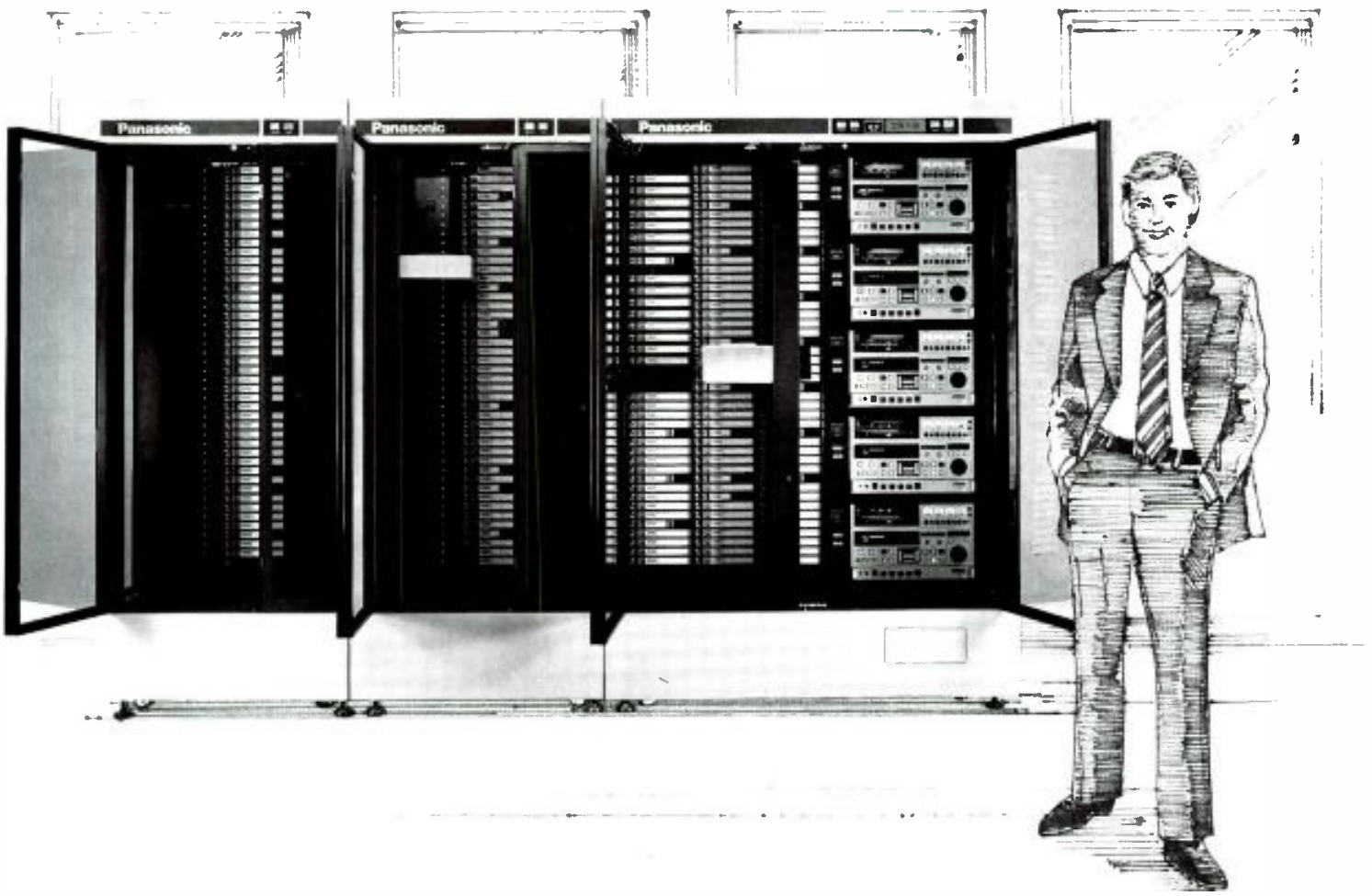

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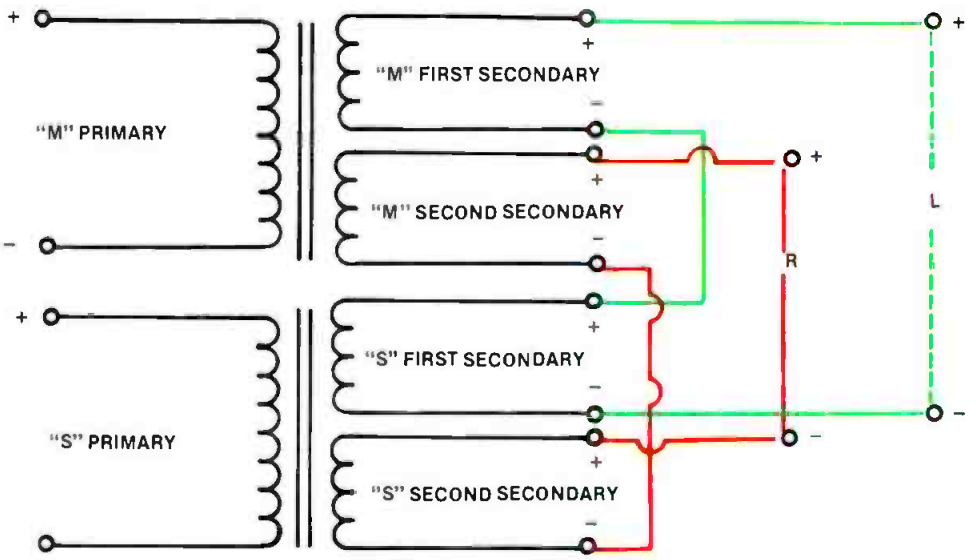


Figure 8. *Special transformers can be used to develop discrete left and right signals from the M-S microphone signals.*

axis should be pointed toward the ensemble. The output of this channel is a mono signal (L+R).

The "S" microphone, as shown in Figure 7, must be a bidirectional microphone with its null side pointed at the ensemble. For convention, the front of the bidirectional microphone should be pointed toward the left of the ensemble. This microphone is known as the difference microphone (L−R). These microphones should be placed in a coincident manner to avoid time delays between the diaphragms.

A single stereo microphone often is used for this technique (as well as the X−Y technique discussed previously), because its pattern is easily varied electronically, and having two diaphragms in the same capsule places them even closer in time.

The outputs of these microphones may

Shotgun microphones

By Mike Solomon

High-quality ultracardioid or shotgun microphones can open up a vast array of production possibilities for both studio and field work. It is often necessary to record a sound without showing any evidence of a microphone being present. There may be mechanical barriers present, such as when news crews try to question officials who are protected behind a barricade. It also is common for a producer to want to record dialogue in a film or video sequence without using wireless microphones. In these and many other applications, the shotgun microphone becomes the answer to a production need.

Historically, shotgun microphones were employed by film and TV sound engineers to capture dialogue. The shotgun microphone was a reliable way to get the sound when wireless microphones were not yet perfected. The shotgun microphone allowed the engineer to capture the sound without picking up undesirable off-axis information and without the mic being seen on camera.

Early shotgun models were physically cumbersome, often quite heavy, possessed marginal S/N specifications, and were sensitive to microphone-stand and boom-generated noise. Anyone who had to hold up the microphone, mounted at the end of a long boom, quickly developed strong muscles.

Modern technology has eliminated many of the drawbacks of the early shotguns. Today's microphones provide improved S/N, wider and flatter frequency response, are less prone to mechanical noise, and are lighter in weight.

Solomon is marketing development manager for Beyer Dynamic, Hicksville, NY.

Important criteria

The object of using a shotgun microphone is to capture the desired sound, which may be located far from the microphone, without picking up off-axis sounds. Because the microphone is often far from the sound source, the first criterion for such work is high sensitivity. The microphone also must be able to reject, to a high degree, any sound coming from the side of the microphone—off axis. The attenuation provided in the off-axis direction is crucial to obtaining a clean audio track.

Finally, the microphone's acoustic performance must be similar to that expected from other high-quality microphones. Even though the applications for shotguns are quite different from those where a standard hand-held microphone might be used, the sonic demands are similar.

Today's shotgun microphones are no longer band-limited as they used to be. Wide, flat frequency response is not only possible but, rather, is typical with newer units. This feature is important when the engineers must match sounds recorded from the same actors in different locations on different microphones. Significant microphone coloration would make this impossible.

Condenser designs

Condenser microphone designs often are employed in shotguns. The advantages of condensers include high sensitivity, low noise and excellent frequency response. Although condenser microphones require a power supply, this is seldom a problem with modern cameras and mixers.

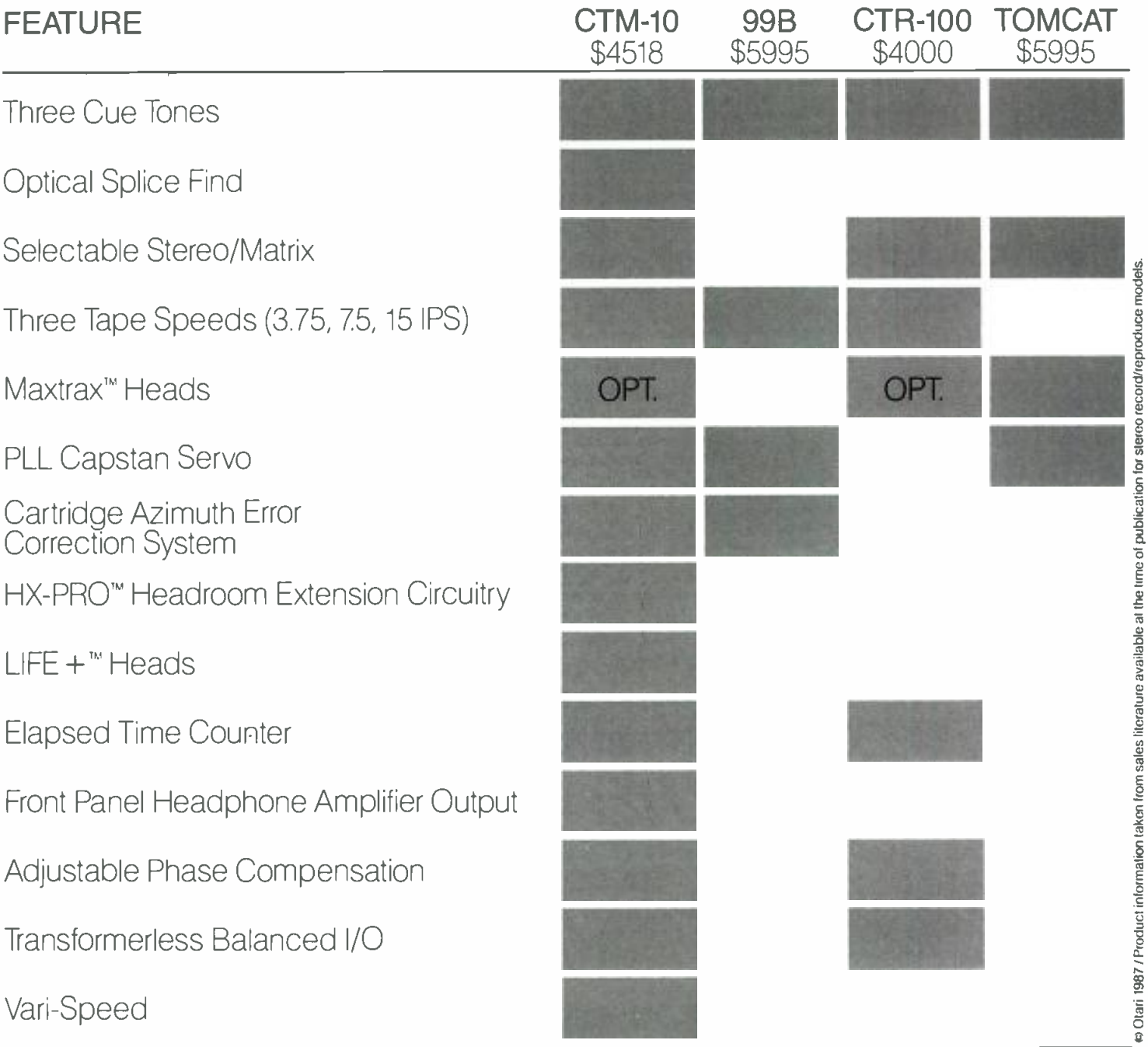
Condenser microphones usually operate on either 12, 24 or 48Vdc. Before using a condenser microphone (shotgun or otherwise), be sure that the phantom supply you will be using provides the correct voltage for that microphone. Some condenser microphones can operate on any of these voltages, which increases their versatility.

Shotgun microphones face many varied assignments. To accommodate special needs, a wide range of options is useful. Although most shotguns have built-in wind screens, optional external wind screens sometimes are needed. Shock mounts, pistol grips, boom clamps and carrying cases are other typical options. Be sure the model you select has the options for your particular application.

A low-frequency cutoff switch also is an important feature. Whenever the microphone is used on a boom or fish-pole, low-frequency noises are generated. A switchable filter will help eliminate them. Passive input pads also may be necessary if you expect to record loud sounds.

Before you purchase a microphone, spend some time listening to several different models, side by side. You'll be amazed at the sonic differences. If possible, obtain a demonstration unit, and try it in your application.

CART MACHINE HEAD-TO-HEAD COMPARISON



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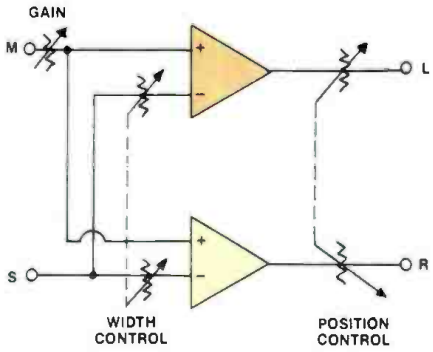

Figure 9. Active circuits, such as this one, provide both width and position controls.

be recorded on tape directly from the microphones. They are already in the (L+R) and (L−R) format needed for stereo broadcasting. If desired, there are various ways to decode the signals before putting them to tape so they may be recorded as pure left and right channels.

Decoding M-S

A common form of decoding is the use of two hybrid transformers (see Figure 8). These transformers consist of one primary winding and two secondary windings. The primary winding is wired to the output of the microphone. The negative terminal of the first secondary transformer of the M microphone is wired to the positive terminal of the first secondary transformer of the S microphone. The left channel is then read across the positive terminal of the first secondary transformer of the M microphone and the negative terminal of the first secondary transformer of the S microphone. It is performing the arithmetic operation of:

$$\frac{1}{2}M + \frac{1}{2}S = L$$

To read the right channel we connect the negative terminal of the second secondary transformer of the M microphone to the negative terminal of the second secondary transformer of the S microphone. In this case, the arithmetic operation of $\frac{1}{2}M - \frac{1}{2}S = R$ is being performed. The right channel information appears between the positive terminals of the second secondary transformers of the M and S microphones. The two previous formulas can be proved easily by examining our assumption that:

$$L+R=M \text{ and } L-R=S$$

substituting from above:

$$L+R=\tfrac{1}{2}M+\tfrac{1}{2}R+\tfrac{1}{2}M-\tfrac{1}{2}R=M$$

$$L-R=\tfrac{1}{2}M+\tfrac{1}{2}R-\tfrac{1}{2}M+\tfrac{1}{2}R=S$$

A decoding method uses amplifiers.

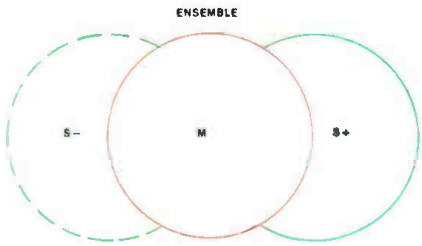

Figure 10. Typical M-S configurations rely on a cardioid microphone for the mid and a bi-directional microphone for the side signals.

which provide control of the width and position parameters (see Figure 9). The M microphone is brought up on a channel with no alteration. The S microphone's output is split, one is sent to a channel directly, and the other is phase inverted and sent to another channel. The phase inversion may be performed on a standard microphone mixer if it has a phase reverse switch or a standard XLR connector may be wired so the high and low pins are reversed. To balance the

Continued on page 100

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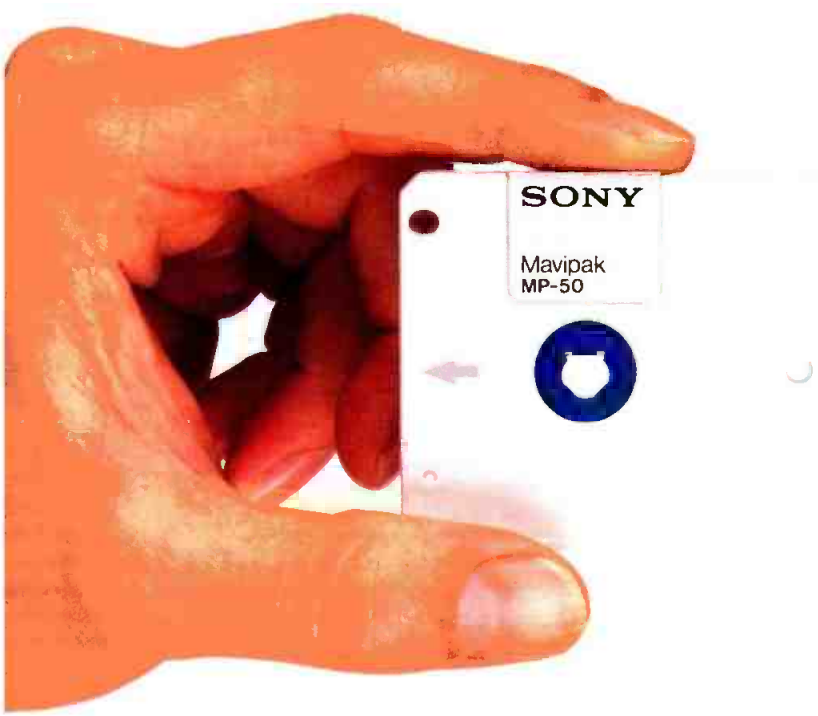

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John R. Banoczi, General Manager
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"When it came time to buy a 35 kW transmitter, we found that Harris had the right product with the right features at the right price — so we went with the Harris FM-35K.

Besides — Harris has an excellent reputation for backing and servicing the products it sells."

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And Harris's SunWatch has completely solved our PSA/PSSA power scheduling problems. I don't know how a station could do it otherwise.

When we've needed service, Harris has always come through."

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"Most AM broadcasters who have upgraded their facilities in this part of the state have gone with Harris SX transmitters. As you are well aware, this is a lightning prone area of the country, and our SX-5A has performed well above our expectations in the area of maintenance and downtime.

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"Before we switched to Harris, we were barely on the air with a poor signal. Our FM-3.5K, 3.5 kW transmitter makes us a stand-out on the dial."

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Don Vest, Director of Engineering
Sigma Broadcasting, Fort Smith, AR:

"KHBS is our first Harris installation, and I'm very glad I did it.

What impresses me most about Harris is the service and parts support. In 19 years of broadcasting, it's the most cooperative and helpful in the industry.

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"Our FM-3.5K, 3.5 kW transmitter has operated flawlessly since our sign-on last November.

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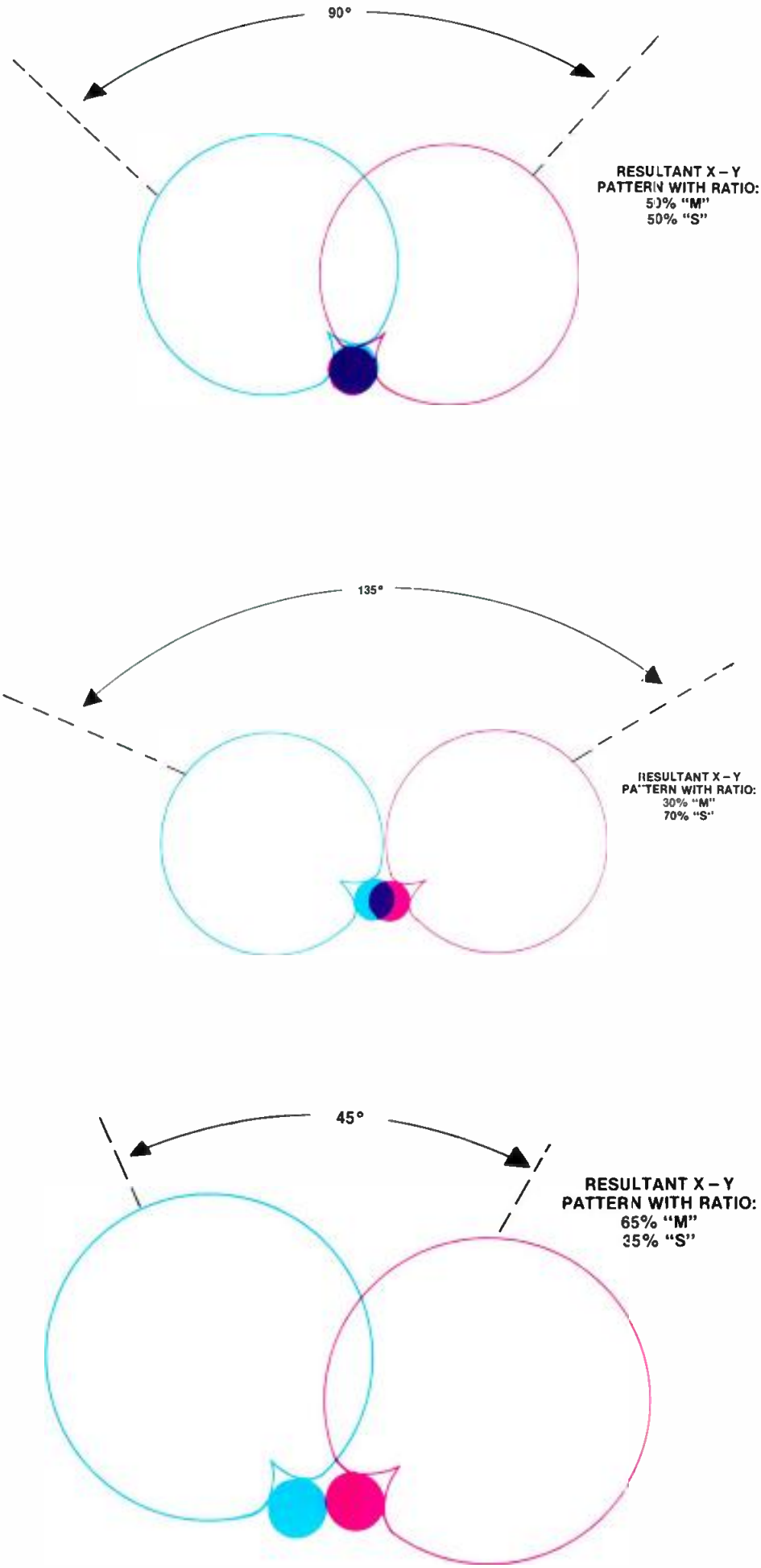

Figure 11. By changing the balance between the mid and side microphones, the relative image width can be adjusted. Note the change in pattern width as the ratios are changed.

Continued from page 96

"S+" and "S–" signals, simply pan both channels to the same side and adjust the gain until there is no output. Next, pan the S+ signal to the extreme left and the S– signal to the extreme right. If you then subgroup the two S channels, you will have created a width control.

The concept of width is important. If the stereo image is too wide, not only will there be a perceived hole in the middle of the stereo image, but the listener/viewer will become disoriented because the aural cues do not match the visual cues. If the difference channel output is attenuated, the sum (mono) channel will predominate, thus moving the entire program toward the center. Attenuating the difference signal also may remove a lot of the reverberation in the room. This effect will be even stronger if a directional microphone is used for the M microphone, because most reverberant information will enter from the S microphone (see Figure 10).

The resultant pattern, when there are equal proportions of M and S signal, closely imitates the pattern of a semi-coincident technique (see Figure 11a). An increase of approximately 40% more S than M will yield a greatly exaggerated stereo image of close to a 135° frontal lobe (see Figure 11b). An increase of 30% more M than S would narrow the stereo image to about 45° (see Figure 11c).

The position control acts as an ordinary pan pot, shifting the decoded information between the left and right channels (refer to Figure 9). This has the effect of electrically panning the microphone pair. Instead of having a boom operator following the action, the microphone pair may be electrically steered.

Accent mics

In all the techniques examined so far, only two microphones are needed. A standard rule for any recording technique is that the fewer microphones used, the more natural and accurate the sound achieved. If the world was perfect, a stereo microphone pair could be used to record a perfectly balanced orchestra and produce a perfectly balanced recording. This is obviously not the case.

From time to time extra microphones are needed to pick up either soloists or quiet sections of the orchestra. These accent microphones can cause great anomalies in the stereo perspective. The problems result from arrival time differences between when the sound reaches the accent microphone and the time that it reaches the main stereo pair (see Figure 12).

Even if the amplitude of the stereo array is as much as 10dB louder than the accent microphone, the accent micro-

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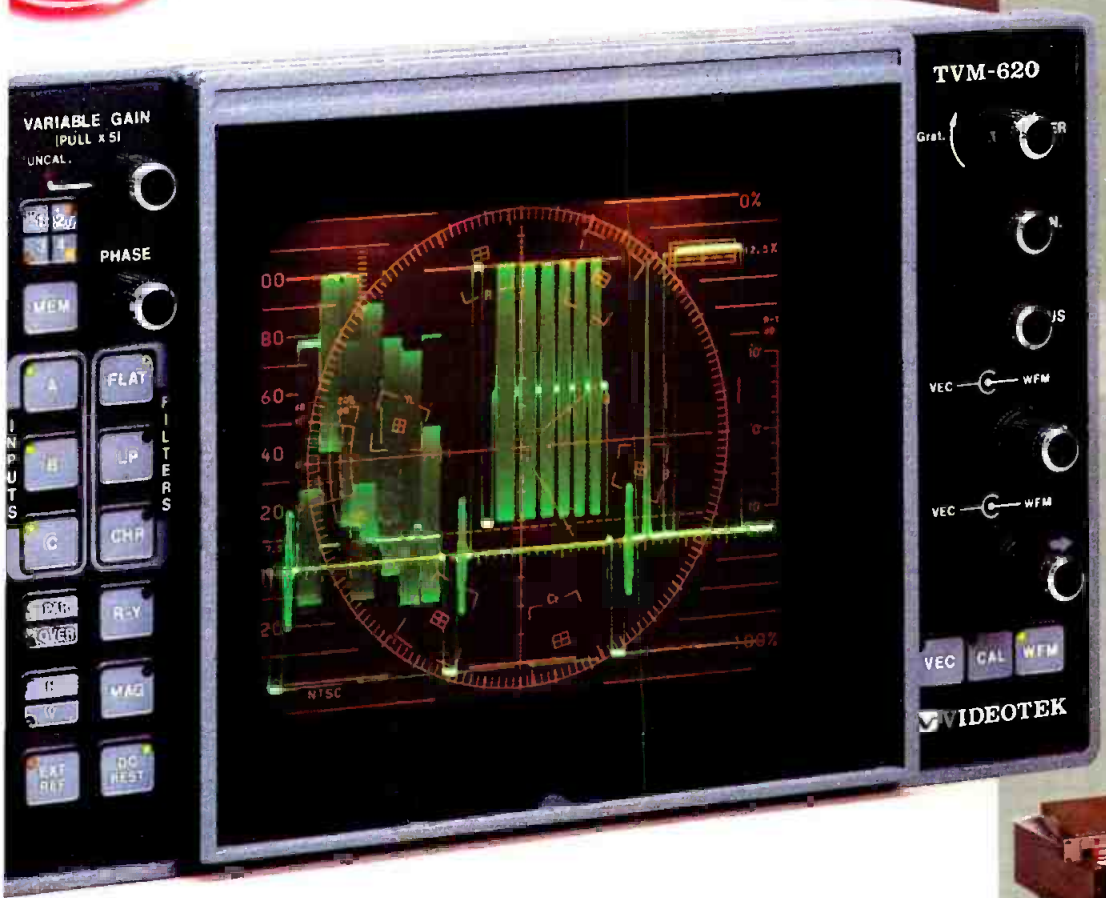

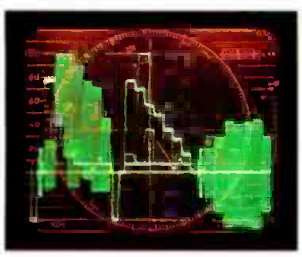

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phone will still sound "in front" of the stereo image. This is because of the *Haas effect*, which relates arrival time to the apparent direction of the source. For example, if a sound reaches the left ear at least 30μs before the right ear, the sound will be perceived to originate from the left side.

A solution to this problem is to fix the time differential by delaying the accent microphone according to the following formula: delta T = 1.000D/c, where c is the speed of sound through air (1.130ft/s), delta T is the delay time in milliseconds, and D is the distance (in feet) from the accent microphone to the main array. Now the accent microphone and the main array are electrically coincident. This avoids having the accent microphone predominate in the stereo image, and also eliminates any frequency distortions from comb filtering.

A final consideration in multimicrophone usage is that of leakage. The source of one accent microphone should not be picked up by another because this limits the control of each accent microphone in relation to each other, and to the main stereo pair.

A simple rule to remember is the 3-to-1 rule. This rule requires that an undesired source be at least three times the distance from the microphone than the desired source. This provides about 10dB of attenuation to the undesired source. The principle is based on the inverse square law, which relates amplitude attenuation as a function of the inverse square of the distance. As a general rule this works well. Problems arise when the undesired source is greater than 10dB louder than the desired source and thus the attenuation is not sufficient to avoid leakage. To solve this problem, either the undesired source must be moved farther away from the accent microphone or the desired source must be moved closer to the accent microphone.

Although many recordings are made with 10 or 20 microphones, the value of the simple 2-microphone stereo techniques mentioned here should be given thought and time for experimentation. After all, you have only two ears.

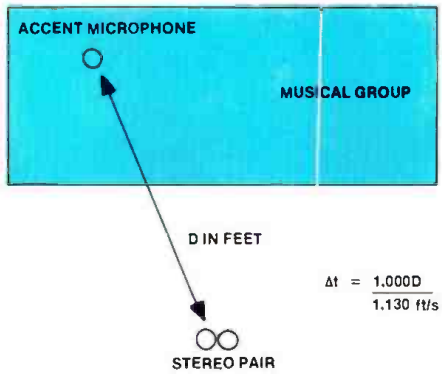

Figure 12. *Accent microphones often are required. Unless they are carefully placed, however, comb filtering may be produced.*

Bibliography

Aldred, John. "Manual of Sound Recording." Fountain Press, London, 1968.

Borwick, John. "Sound Recording Practice." Oxford, New York, 1980.

Eargle, John. "The Microphone Handbook." Elar, New York.

Nisbett, Alec. "The Technique of the Sound Studio." Focal Press Ltd., Suffolk, 1972.

Runstein, Robert E. "Modern Recording Techniques." Howard W. Sams & Co., Indianapolis, 1985.

Woram, John. "The Recording Studio Handbook." Elar, New York, 1982.

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After years of working with manually operated cart machines, the engineering staff at KTSM is breathing a sigh of relief. Now they rely on The Odetics Cart Machine.

Mac McGill says that The Cart Machine has been responsible for a dramatic reduction in errors — spots airing at the wrong time or not at all.

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The Odetics Cart Machine can automatically manage, record and play-to-air all forms of spots and programs — including events as short as one second.

An average day's play list at KTSM consists of 380 to 400 individual cart events, including repeats. Mac cite's the Cart Machine's extraordinary storage capacity — which includes a 65,000 cart database and 1,600 event look-ahead feature.

"The Cart Machine requires a minimum amount of space, yet it has a library of 280 cassettes. That allows us to store almost an entire day's worth of events."

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A back-to-back success

By Brad Dick, radio technical editor

It was a back-to-back success. The 1987 national SBE Convention and **Broadcast Engineering** Conference was even more successful than last year's show. The final tally shows a total attendance of more than 4,400, including 1,353 exhibitors. These figures represent approximately twice the 1986 attendance.

Conference success

The **Broadcast Engineering** conference attracted 752 registrants, again more than twice as many as last year. Even the early-morning and late-evening sessions, which traditionally are less well-attended, had a large number of participants. One session on audio processing had more than 600 participants.

The conference presentations, coordinated by John Battison, included some of the most knowledgeable people in the broadcast industry. The Tuesday morning conference opened to a full house. Master-clock systems, lightning and digital audio sessions were well-received by the audience.

At the close of the Tuesday morning sessions, Tom Keller, senior vice president of NAB, piqued the attendees' interest in future technology. Keller challenged the engineering managers to become attuned to the more complex nature of tomorrow's equipment. Technical staffs will need to become more trained and skilled as the demands of servicing station equipment increase, he said. He also spoke of the greatly improved images broadcasters will be able to transmit with HDTV.

The Tuesday afternoon maintenance session was a big hit. The session included presentations from such notables as Ray Roher, K.W. Hoehn, Mark Dobronski, Jeffrey Steinkamp, Mark Persons and Robert Surette. After brief presentations, the session opened to questions from the audience. The advantage of such a panel discussion is that many viewpoints can be offered on a topic, and such was the case. Many engineers called this session the best for their money.

The meeting room was practically bulging for the Tuesday evening "Nuts and Bolts" session, which included several equipment manufacturers and other audio-processing specialists. Audio processing is always a hit topic among engineers, and there was no lack of enthusiasm or controversy in this one. Lasting more than two hours, this session was rated as one of the best by those who attended.

The Wednesday sessions were broken down into separate radio and TV sessions. This arrangement allowed presenters to direct their papers to the appropriate technology.

The FCC speaks

Another highly attended session was staffed by FCC engineers Robert Greenberg, Jim Ballis and Keith Larson. The panel discussion allowed station engineers, who could remain anonymous if they wished, to obtain first-hand information from the people who review applications and help enforce regulations. Based on expressed interest, look for this session to be repeated next year.

Thursday's luncheon was highlighted by speaker Alex Felker, the FCC's new mass media bureau chief. Felker's belief that stan-

Photographs by Edwin Karl Photography

It was a busy time for exhibitors, as more than 4,400 attendees crowded the exhibit floor.

One advantage of the SBE convention is that exhibitors staff their booths with technical personnel who thoroughly understand the products.

Alex Felker, FCC chief, Mass Media Bureau, was the speaker at the Thursday luncheon.

The St. Louis Ambassadors presented the SBE an award to honor the society's second national convention. Jack McKain, president, looks on as Margaret Rambo presents the award.

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Show replay

129th SMPTE reflects new attitude on HDTV

By Jerry Whitaker, editorial director

Technology reigned supreme at the Society of Motion Picture and Television Engineers' 129th Technical Conference and Equipment Exhibit Oct. 31 to Nov. 4 at the Los Angeles Convention Center. The show offered attendees an impressive display of everything related to video. The annual conference is the TV industry's major engineering event; it is an opportunity to look into the future and to plan for it.

The technical conference provides a worldwide forum for discussions and demonstrations of advanced motion-picture and TV work. It is one of the world's premier meetings of engineers, technicians, scientists, film and video equipment operators, marketing and management people—anyone on the technical side of motion pictures and television who wants to keep abreast of new technological developments. Once a small gathering of film engineers, the SMPTE conference has grown to be a major event.

So what was new at the show? Well, a lot of things—new cameras, new graphics systems, new video recorders and new audio consoles. But hardware was only the tip of the iceberg. The real news, in the view of this observer, was a significant change in the TV industry's attitude toward high-definition television.

HDTV makes its move

Three years ago, you couldn't give HDTV to TV engineers. The technology was interesting, yes, but little more than a parlor trick. It was described as a technology looking for an application, a solution looking for a problem, a laboratory novelty. But on the floor of this year's show, no such discouraging words could be heard.

HDTV has arrived not only for the video industry, but also for the film industry. That's not to say that people are rushing out to buy HDTV hardware. They are not. But, the attitudes of attendees have changed regarding the viability of this new technology, and where it may fit into over-the-air broadcasting.

The implementation of HDTV is being blocked by the costs, which can best be described as "high-definition prices." For example, a major camera manufacturer introduced a new HDTV camera at SMPTE that emulates film-style cameras in design and features. The film industry is, in fact, a potentially lucrative market for the device. The price tag: about $500,000.

Other broadcast equipment manufacturers also unveiled HDTV products including a high-definition character generator and an HDTV graphics system. So, the pieces of the high-definition puzzle are more or less in place. Where it goes from here depends, in large part, on which way the film industry and post-production houses decide to move on HDTV.

Production companies for episodic TV programs and feature films are an attractive potential market for HDTV products. The future of this technology also will hinge, in no small part, on what the Advanced Television Systems Committee (ATSC) and other groups decide to do with regard to a transmission format.

At a special engineering demonstration, SMPTE showed 35mm film transfers of high-definition productions. The films, originally shot on video with HDTV production equipment, were shown at 24- and 30-frames-per-second rates. The screenings were impressive from technical and artistic standpoints. The Motion Picture and Television Engineering Society of Japan (MPTEJ) joined SMPTE in sponsoring the demonstration.

Coleman on HDTV

But wait a minute. Not everybody in Hollywood is thrilled about the prospect of using high-definition video to produce episodic programs and feature-length films. In an interview released to the trade press at the show, Leonard Coleman, a vice president at Kodak and former president of SMPTE, threw some water on the rampant enthusiasm of HDTV supporters.

"We need to remember that people don't go to theaters or turn on their TV sets to see technology," Coleman said. "They go to be entertained and, in the process, informed.

"Our role as technologists is to provide the artists who produce movies and TV programs with the tools they need to do their jobs," Coleman said. He believes it is premature to discuss full-scale implementation of HDTV technology. "... at this early point in the game, I would hate to see us mortgage the future of the industry by locking into a worldwide standard which could cost tens of billions of dollars ... a standard which might inhibit research and development along alternate paths. I just don't believe that this would really serve the purposes of the production community, theatrical exhibitors or broadcasters," he said.

High-definition video often has been described as comparable to 35mm film. Coleman, however, takes exception to that. "I'm sure (HDTV proponents) believe what they say, but they are looking at the issue from a different perspective. ... The facts are that 35mm color negative film gives the cinematographer a richer palette to work with. Today's color negative film is capable of recording as many as 2,200 lines of resolution. Scene luminance ratios can be in the range of 100 or 200:1, with 500:1 a possibility. Latitudes can be extended to seven stops. The exposure index for a typical high-speed negative film is EI 400:1.

"The HDTV cameras that we've seen produce a very good image, but the resolution is 1,125 lines, and latitude is limited to five stops. Luminance ratios are much more limited than film, and the exposure index is probably EI 50 at best. Until there's a CCD HDTV camera, there will be problems shooting into the sun, panning by a flame, and so on. You are also dealing with a more cumbersome camera which is tethered to a recorder and monitor."

And so, the battle continues.

Format phobia

The second major development that seemed to come to light at SMPTE was a reconciliation to the fact that it has become a multiformat world. Tape technology has moved rapidly this decade and given users

New products

The annual fall SMPTE convention has become a popular time for video manufacturers to make product introductions. This year's show was no exception.

We will devote our "New Products" column this month and next month to SMPTE product introductions. This approach gives us the ability to describe the products in greater detail. We hope you find this format useful and informative.

Coverage of new products begins on page 132.

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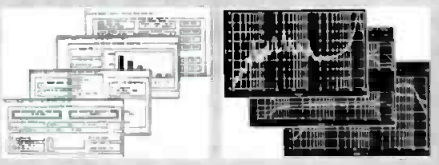

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Booth traffic was generally heavy throughout the show at the larger displays. Some exhibitors near the back of the hall, however, complained about too few attendees.

a host of new ways to put pictures onto magnetic tape. And although many in the industry would like to return to simpler times when you could determine a tape's format by measuring it with a ruler, those days are long gone. And probably for good reason.

Each format available today offers a unique benefit to the user. It makes buying decisions much more complex, but the potential for returns is greater.

As a case in point, the D-2 4fsc digital composite tape recording format has won a number of converts who believe that it will be the next replacement for 1-inch type C video recorders. (D-2 is the tentative designation given to the composite digital format for standardization work currently in progress.) Ampex, the primary D-2 proponent, demonstrated its D-2 composite digital system at the convention. The company announced it will introduce a D-2 studio VTR for broadcast and post-production applications at this year's NAB show in Las Vegas.

The D-2 format demonstration used the basic building blocks of the ACR-225 commercial spot player, including the signal system, tape transport and human interface.

Sony also is expected to show hardware made to the D-2 format at NAB.

SMPTE statistics

SMPTE reported good attendance at the fall show. A total of 17,056 people showed up for the conference and exhibit, a record for the society. The previous SMPTE attendance record was 16,812, set in 1986 at the Jacob Javits Convention Center in New York.

Attendees came from motion-picture studios, broadcast networks, TV stations, cable TV companies, production houses, post-production facilities, film laboratories, manufacturing firms, educational institutions, the government and the military. And they came from all over the world.

The technical program, which each year forms the basis for the conference, featured 148 engineering presentations on video recording, post-production, high-definition television, film laboratory practices, fiber optics, and other motion-picture and TV subjects. The theme of this year's gathering was, "Imaging and Sound—Today and Tomorrow."

The program was kicked off with a welcoming speech by SMPTE President M. Carlos Kennedy (Ampex Corporation), an engineering report by SMPTE Engineering Vice President Richard G. Streeter (CBS), and the keynote address by Daniel Slusser (Universal City Studios).

At the honors and awards luncheon on Saturday, Oct. 31, SMPTE presented 20 certificates for outstanding technical achievement, authorship and service to the society and the industry. Irwin Young (Du Art Film Labs), sections vice president of the society, received the 1987 Progress Medal, SMPTE's premier award. Fifteen new Fellows of the society also were honored at a luncheon.

The guest speaker at the annual luncheon was Jean Firstenberg, director of the American Film Institute. She urged the audience to continue efforts to preserve the aging libraries of old motion-picture films before they are lost forever to deterioration. She described the work as the film community's responsibility to future generations.

Keynote address

In the keynote speech, Daniel Slusser, vice president and general manager of Universal City Studios, told his audience that film is the foundation of the motion-picture and TV industries. "That's where the programming starts," he said.

If it was video, you could find it at SMPTE. A number of significant product introductions were made.

"Approximately 85% of all programs broadcast on the three major TV networks in prime time are produced on film. Without film to record our images, there would be no need for our studios, or the people who work there," Slusser said.

He went on to advance an interesting proposition. "If the chronological order had been reversed, and if videotape had come first, and film had followed years later, our industry would have been stunned by the creative impact of the new medium: film. For all of the same reasons, film also is the most desired medium for worldwide distribution. Film is the universally accepted medium for the distribution of movies and TV programs."

Slusser urged SMPTE members to work for an orderly progression of technology as the industry looks toward the future for both film and video. "It is the obligation of engineers

and their organizations to help management chart an orderly, coherent progression into the future," Slusser said. "You must be the technological conscience of a very self-indulgent industry. The true test of worth is not merely technological flash or glitter, but whether or not the job is done better, with greater economy and improved quality.

"Standards are clearly the glue that holds our industry together. People who use technology, as opposed to those who create it, tend to take standards for granted. Standards are an essential element. They are part of the integrity and craftsmanship of the actual product," he said.

Despite his embrace of 35mm film as the predominant high-definition medium, Slusser did concede that HDTV will have a place in movie studio production work. "The emergence of new electronic technology with the promise of quality comparable to film has gotten our attention, and does warrant the close scrutiny of the film industry. The potential of such a system to augment film production, and its possible impact on distribution, could have an important influence on the future of our studios."

If you were looking for specialty equipment, SMPTE was the place to find it. Most manufacturers of film camera support equipment also offered mounts for video cameras.

Ah, refreshments. There seemed to be more free refreshments per aisle at this show than at previous SMPTE exhibitions. This trend is good for the industry.

A changing emphasis

A subtle, but significant, change noticed at this year's show was the lack of film-related products. SMPTE has its roots in the film industry, which dominated society activities for many years. But all that has changed.

In Los Angeles last November the number of booths selling only film products was lower than at any time in recent memory.

Film technology is an art form. It has reached a level of maturity and sophistication that video enthusiasts should envy. But film hasn't got the sizzle that videographics and effects do. It is not as exciting as a big audio console. And it doesn't generate the controversy that a tape-format battle does.

Despite all this, film is still the bedrock of what broadcast audiences see every night. Film is a durable medium, in more ways than one. Don't pull the sheet over it yet.

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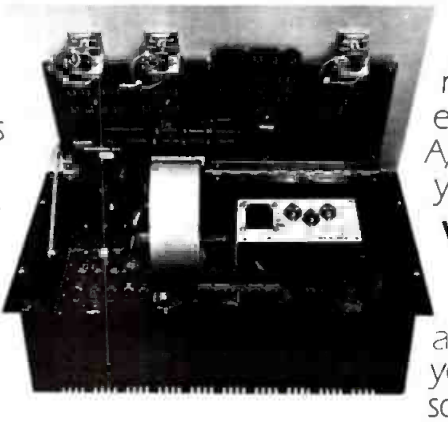

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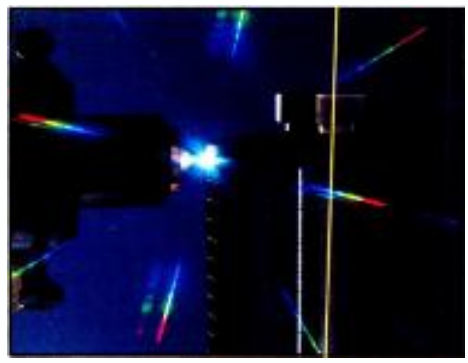

Rank Cintel gallery system

By J. T. Way

Two minutes to air!
Where's the slide?

By and large, broadcasters and video professionals are using outdated, inefficient methods for handling their rapidly growing slide and still-image inventories. The truth is, many tasks that are done by hand can be automated with computer databases, work station networks and magnetic and optical storage media.

The use of high-quality still frames in television has gone beyond a few drawers of 35mm transparencies. As graphic artists become overtaxed, or as their departments automate in a natural course of evolution, slide management logically falls into the computer realm. An efficient management system can solve the problems of cataloguing a large number of images and stills extracted from program material. It also can make access to all available images of a given category almost instantaneously. These two factors can be expanded with 4:2:2 interfacing of digital equipment into a network, placing a variety of modification capabilities in the hands of the artist. The result is a customized image in less time and fewer processing steps.

Automation concerns

The development of a still-frame presentation system must take a number of operations into consideration. The desirable capabilities include:

- Scanning and transforming (digitizing) existing 35mm slides into storable electronic images.
- A method to grab frames from broadcast ("air") or the telecine.
- The capability for treating or graphically modifying archived slides.
- Storage of still images in a safe, permanent medium that also affords ready access.
- Provision for programmable "play" lists for on-air transmission.

To answer these concerns, a still-imaging system, when fully implemented, will consist of a number of components: a slide scanner, a filing system for short- and medium-term storage and manipulation, a paint unit with graphics tablet, and a system master store for long-term mass filing and digital archiving.

Way is a technical writer for Rank Cintel.

A number of systems are available that can accomplish the functions. But for the system to be efficient and easily manageable, some way of tying the various parts together into a working network is necessary. The ideal approach to building such a network is to use components that conform to standard parameters, allowing easy interfacing from one unit to another. Conforming to CCIR 601 sampling and SMPTE RP 125/4:2:2 digital standards, for example, presents the possibilities of combining an image library system with additional equipment for complete picture archiving facilities. The resulting digital graphics network can offer presentation effects controls, graphics creation, and dual-channel, preprogrammable, on-air transmission in addition to the computerized library functions.

The digitizing process

Digital sampling has developed into one of the more important aspects of the still-storage component's functions in the modern video facility. While the interest in digital equipment and use of digital video information in the studio is growing, the choice of interface and standard, as well as minute particulars of the digitizing process, are factors that distinguish one system from another.

The industry is fortunate that a standardized digitizing process has been developed for still-imaging systems, namely the CCIR REC 601 international standard. In the classic YUV format—Y (luminance) sampled at 13.5MHz and U/V (chrominance) at 6.75MHz—the signal is processed by linear 8-bit quantization. With orthogonal sampling, U/V information is co-sited with odd luminance samples. The 8-bit YUV sampling process yields an active picture of 720 luminance pixels per line with 360 each for U and V color difference information. The images retain full data integrity during subsequent shrink and expand functions or other manipulations.

Data and control interfacing to other equipment uses standard CCIR REC 656/SMPTE RP 125 inputs and outputs.

The control panel, immediately to the right of the video switcher, integrates the still presentation unit with other equipment at TV Ontario, Toronto, Canada.

System synchronization

When grabbing video frames from various sources, problems of timing and synchronization can arise. A digital still-store work station with a "floating front end," rather than a fixed or "locked" input, can alleviate such problems. With the input and output separately synchronized, and the output linked to reference mixed syncs, the storage unit becomes a live video synchronizer for remote asynchronous sources. Because the system may be involved with analog equipment, 75Ω interconnection to standard RGB/sync and composite video units also must be considered, both for input and output use. In this regard, timing of analog outputs, relative to input reference sync, is of concern.

Any system bearing the SMPTE interface is compatible with all similarly equipped systems, meaning that digital studio managers may choose from a range of competitive equipment, tailoring not only their still storage and graphics systems, but a full gamut of studio hardware.

How images are stored

Storage capabilities of an image management system fall into different categories: short-, medium- and long-term areas. Short-term would be for instantaneous access needs. Medium-term storage serves images to be modified or for those scheduled for broadcast in the near future and is perhaps best handled with Winchester disk memory. Although capacities vary, a hard-disk library of 400 525/60 frames is not unrealistic.

Eight-inch Winchester disks alone are not

sufficient for long-term storage of a growing library. One method to extend archive storage capacity is with a streaming-tape backup system. Such devices commonly use 300- or 600-foot tape lengths (30Mb or 60Mb) for 30- or 60- (525/60) frame capacity. A typical data transfer rate of 90kb/s requires a relatively short time to transfer data to and from the tape cartridge.

Another method for long-term archiving that still allows quick retrieval of data is the dual-sided, 12-inch optical disk, a medium that is finding growing interest for all data storage systems. Each side of an optical disk offers a capacity of 1,400 525/60 frames. A host computer for the optical storage system will serve multiple storage and graphics work stations with logically assigned VDUs. Stills from any system component of the network (scanner, Winchester store or graphics tablet) are available to any other work station through this central storage system. Stills may be digitally transferred from one unit to another unit with no disruption of the transmission process.

By using an interactive network, the control system may serve as master control, a still warehouse and a programming center for a multiple work station storage and graphics installation. This storage concept combines resources of several interfaced devices in the studio. The broadcaster can catalog, library and cross-reference the slide inventory, use a SMPTE interface to other studio equipment and, theoretically, extend the management capability to film libraries and ENG material from any system control panel.

A drawing pad serves as a typical input for the graphics generation function.

Effects facilities design

Modification facilities increase the potential of any slide library. A benefit of electronic slide management is that routine slide maintenance chores, such as cropping, reducing, bordering and captioning, are accomplished with relative ease. An interface for graphics equipment ought to allow a tie-line to any of various graphics packages, because many facilities may already own stand-alone graphics equipment.

Maintenance packages take on various forms; a tracker ball, for example, can provide easy control of production effects. The effects capabilities on the package menu probably will include features of crop, border, color modification, background coloring and picture composition as basic items. Other important features are overlay creation and variable aspect resizing.

Presentation of stills through cut, mix or fade functions also is desirable. For such purposes, a play-list compilation function memory-sequencing program offers manual or automated operation of the system. Sequence editing functions may include insert, delete, replace and reset commands.

The unit also must address interfield flicker and NTSC coding footprints—common visual flaws.

Graphics technology

What sort of technological array is necessary for a separate graphics package? A realistic complement of equipment includes a digitizer pen, an integral menu system, a graphics tablet and a VDU (for status display).

A drawing tablet can be used to produce aliased or anti-aliased work, with a connection to its host graphics unit through ports for serial RS-232 or RS-422. The graphics tablet offers 400 lines per inch of resolution, a full line of brushes, effects (such as stencil and mirror) and comprehensive geometric aids. To view the work in progress, some operators prefer a color screen uncluttered with a function selection menu. Other users might prefer at least an option to pull a palette menu onto the screen.

With an RS-232 data connection, there is no additional intermediate transfer medium needed for on-air transmission of graphics prepared on the host storage and manipulation unit. An internal linear keyer allows insertion of externally sourced material, such as titles from a separate character generator, into any frame in the picture library.

A graphic art/paint system must address the reality of illegal colors. Of 16 million possible colors, a significant number are illegal by virtue of their vector reference and may present problems for VTRs or transmitters. The solution is to equip the graphics work station with selectable algorithms to preclude the transmission of illegal colors.

Database access

Having settled on technological aspects of digitizing and storage, the next step is to consider how a vast library of still images can best be accessed and arranged. In a fully configured system, there may be on-line/off-line work stations located in separate rooms of the facility or even remotely in other locations. This allows program directors and station managers to program play lists as much as a week (theoretically, even months) in advance. Before air time, the central unit automatically transmits the play-list stills to the correct location. Sequencing can be changed immediately before or during transmission.

In addition to a text display of information, a polyphoto display of stills in storage helps in image location.

A practical system must have a flexible, dynamic interface with the picture library contents. A search through the index of pictures might be by title, category or keyword, or a combination of these. The results of a search can be presented in alphabetical order (the default), by date of origin, date of most recent use or by total number of uses.

The user can scroll through the library to select an image. Once located, the image is called, altered as necessary, and saved as a modified graphic to a new "cell number." Images not already in the system can be loaded directly into memory from any active video source.

Some examples show how search systems help users find the right picture quickly. For example, a command such as REAGAN? will find all pictures of the president. REAGAN?THATCHER? finds only pictures of Reagan and Thatcher together. Meanwhile, BUSH? pulls out pictures not only of the vice president, but of park shrubbery as well. However, if you use the BUSH? command in the title under a POLITICIANS category, only pictures of George Bush will appear, and so on.

A "wildcard" database search is another type that might be of value at times. In wildcard mode, a command such as ?GIC? might call up MAGICIAN or LOGICAL—and SHO?T? could get a picture of a recent shooting, of a vaccination clinic, or "young man in red shorts."

From the traffic department's point of view, the capability for obtaining "yesterday's" and "today's" frame rosters and play lists, as references, through the search menu concept, is of interest. Although commercial messages may require repetition to be successful, the graphic look of television can be enhanced if some variation in stills is possible.

For protection, the computer should not erase any frame unless specifically commanded to do so, even though some unwanted frames might be grabbed or generated in a single work session. This problem can be answered by not storing anything automatically to its optical disks. As a result, the user always has a "scratch sheet" of frames for the day's work.

Managing the disk's contents

Everyday system management is of interest in considering such a comprehensive networked system. An automatic reporting system, typically active during hours of nonuse, prints reports of the stills broadcast the previous day. For complete flexibility, however, users need the capability for calling up, creating and printing sorted contents and information lists at any time.

The practical optical disks available now are WORM (write once, read many) technology. Actually, pictures cannot be deleted from the file once they have been written. However, unwanted images can be deleted from the index, which renders them as good as gone. Integral protective software functions in system "housekeeping" help to avoid inadvertent deletion. For example, the user must type the full title of the frame to be marked for deletion after activating the erase mode. The frame will not actually be deleted at the time the command is issued but, rather, appears on a deletion roster during the machine's nighttime activities. For a final check, the operator is asked to verify the deletion the next morning.

In an application in which access to an enormous number of still images within seconds is required, the presentation system needs to be digitally interactive. Optical disk storage, combined with 4:2:2 digital interfacing, component design, slide scanning and graphic/paint facilities, can make mass still-image archiving and comprehensive system management a reality.

Editor's note: The system discussed in this article includes the Logica Gallery 2000 picture library combinec with the Rank Cintel Art-File graphics/paint unit. SlideFile basic storage/manipulation device and ADS-80 slide scanner.

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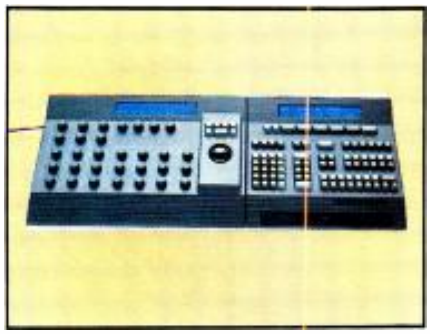
da Vinci Unified Color Correct System



By Randy Seiler

When the Dallas Post-Production Center decided to build a state-of-the-art film-to-tape transfer suite, the objective was simple. We wanted a new suite that was so powerful and efficient that Southwest-located producers and directors would bring us their business instead of going to the coasts.

A key component in the new studio design was the purchase of a VTA Technologies da Vinci Unified Color Correct System. This computer-driven color processor not only allows scene-by-scene color correction, but also is a powerful and creative post-production tool.

In addition to the color corrector, we selected a Bosch FDL60B telecine and an Ampex ADO repositioner for the production suite. Additional peripheral equipment was purchased to provide the necessary switching, background effects and digital audio processing. The equipment combination provides the versatility needed for high-quality film-to-tape transfers and post-production effects.

Seiler is engineering manager for the Dallas Post-Production Center, Dallas.

Performance at a glance

- *Video inputs and outputs:* RGB; IQY; R–Y, B–Y Y; R–Y, B–Y, G–Y, Y; NTSC; PAL
- *Frequency response: ±0.2dB 100kHz to 6MHz; ±0.3dB –1dB 100kHz to 8MHz*
- *K factor: less than 1%*
- *Differential phase: 10%-90% APL 1°*
- *Differential gain: 10%-90% APL 1%*
- *Signal-to-noise: –55dB 10kHz to 5.5MHz*
- *Digital-to-analog resolution: 12 bit*
- *16-vector color-signal processing*
- *Composite and component corrections*

The process

The color corrector has three signal input formats: two component and one composite (see Figure 1). The user can select the inputs to route to the color-correction system. Two composite outputs and one component output also are provided. The internal signal processing relies on a design similar to that of a 4-tube color camera. The luminance channel is developed and controlled separately from the three chroma channels.

As interfaced at our facility, the color corrector is divided into two basic sections, as shown in Figure 2. The preprocessing section accepts luminance, R–Y, B–Y and G–Y signals from the telecine, modifies the input signal as desired, then sends it along to the ADO in luminance, R–Y and B–Y format. After the ADO performs its work, the signal returns to the color corrector for processing by the Color Grabber.

Control

One of the problems often faced by a colorist is a lack of selectivity. Although it's easy to change the hue and saturation of any color within a scene, the colorist often needs to perform these kinds of changes only to specific areas, rather than the entire scene. To provide this level of selectivity, a color-correction system must offer a wide range of controls.

The da Vinci provides gain, gamma and black-level controls for each of the four color-processing channels (luminance, R–Y, B–Y and G–Y). A master gain control for each of the three basic functions (gain, gamma and black level) also is provided. The three chroma-processing channels allow adjustments to the color balance of the scene without affecting the luminance signal. Similarly, the luminance channel can be adjusted for best gray-scale or contrast without altering the scene's overall color balance.

Dallas-Post photos by Ron Scribner

These photos show the color change possible with the processor. Note that the original blue lamp and surrounding light has been changed to yellow in the second photo, but the remainder of the photo colorimetry has not been altered.

The color grabber allows the colorist to move the screen cursor to any area within the scene. The processor then automatically assigns the appropriate color control to the system. The original yellow dress was changed to white without affecting the scene's colorimetry.

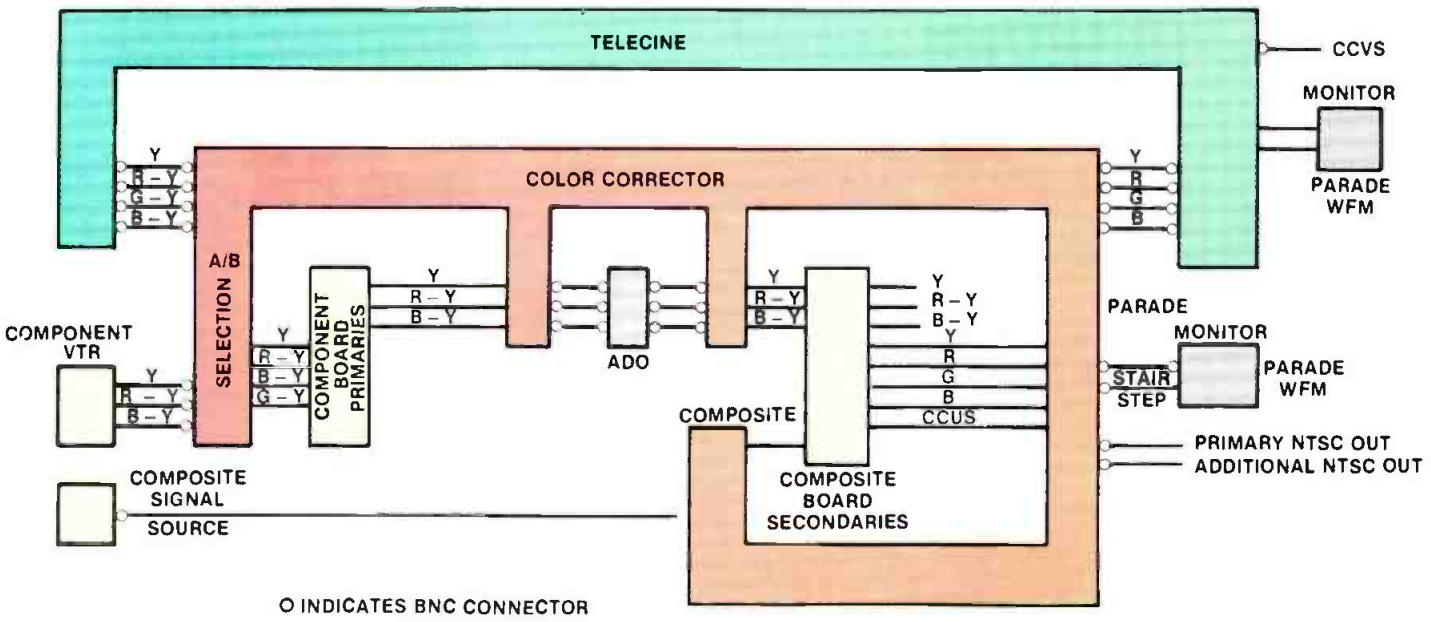


Figure 1. *The color processor interfaces with both a telecine and ADO, forming a complete work station.*

A set of soft-key controls provides two sets of four functions, which are accessed through a vacuum-fluorescent display. The first adjustment, chroma desaturation-light, decreases the chroma saturation in the near-white areas of video.

For example, if a camera or telecine clipper is misadjusted, some whites may not appear as white as others. A cloud may look pink while a lower-level white, such as a shirt, might appear to be properly balanced. Any attempt to color-balance the cloud would change the color of the shirt. The chroma desaturation-light control solves this problem by reducing the chroma only in the area of the highest video level.

The chroma desaturation-dark adjust-

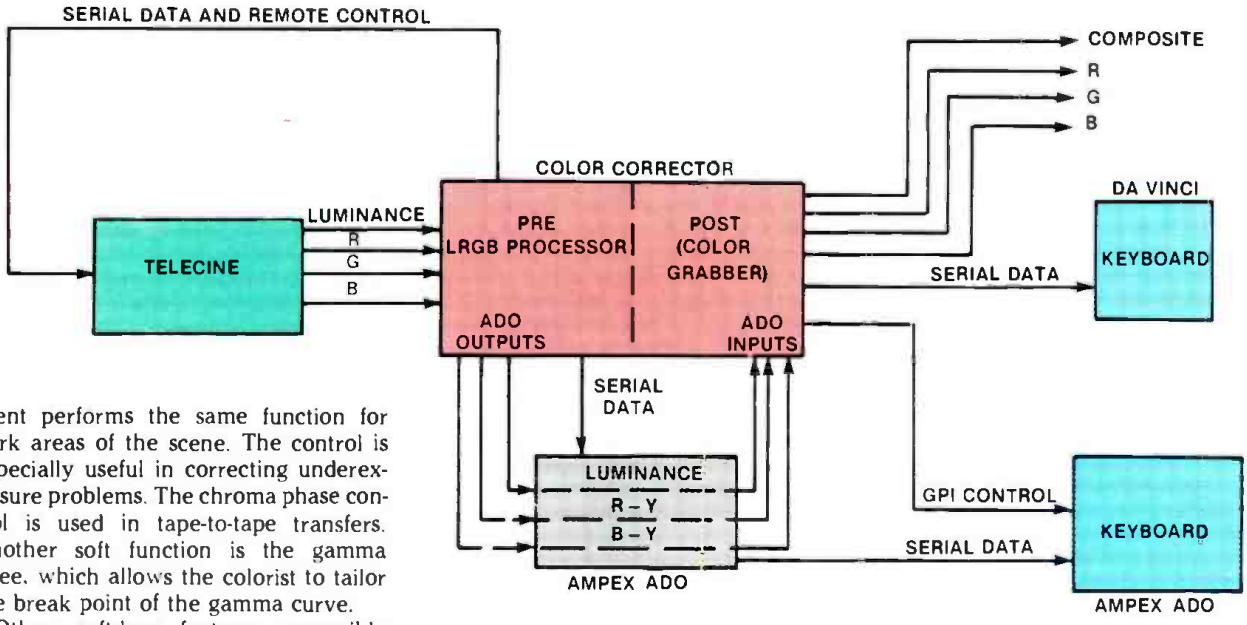


Figure 2. Both component and composite inputs and outputs are available on the color processor. Component processing within the system helps maintain maximum color quality.

ment performs the same function for dark areas of the scene. The control is especially useful in correcting underexposure problems. The chroma phase control is used in tape-to-tape transfers. Another soft function is the gamma knee, which allows the colorist to tailor the break point of the gamma curve.

Other soft-key features accessible through the display are contours, master chroma, soft clip and luminance threshold. The soft clip function enables the highlights to be crushed softly, reducing the reflections and highlight levels while preserving the film's contrast ratios. The luminance threshold works independently in each of the 16 vectors. This design permits the colorimetry modifiers to function above or below a user-selectable luminance level. The result is that an area can be modified while an area of the same color that is

shaded differently remains unchanged.

Multivector processing

Six-vector processing is only the first step to modern color correction. Today's production techniques often need more control than a 6-vector processor can provide. In such a system, each control covers a range of approximately 60°, so the control's maximum effectiveness is centered on one of the primary or secondary color vectors. The maximum effectiveness of the control is reduced to zero as the control approaches its neighboring primary or secondary vector.

If a particular color vector lies midway between any two of the six vectors, then two of the vector controls must be adjusted if changes are desired. Unfortunately, this affects one-third of the scene's colorimetry. Although the term vector is used in this article, note that the color processor does not create and modify color-component signals. Rather than vectors, the processor relies on a range of color characteristics detected in the phase domain of the composite video signal.

Each of the 16 vectors (or ranges) are provided with independent saturation, hue, luminance and luminance-threshold controls. This combination of controls allows any color in the NTSC color spectrum to be within 11° of the maximum effectiveness portion of one particular control. The resulting narrow range provides increased selectivity for the colorist.

The system's capability to provide correction based on the relative luminance level affords greater selectivity for the user. This means that two colors, with the same hue and different luminance levels, can be treated independently.

The photos on page 118 show the effect of this feature. The lamp and its surrounding light are blue in the left upper photo. The processor allows only the lamp and light to be changed to yellow. The remainder of the scene is unchanged.

An operational feature called the Color Grabber uses a track ball to move an on-screen cursor. After being placed on an area within a scene, the grabber automatically assigns to the colorist the control most effective in adjusting that area's color. The system has the capability to "grab" any 24° of the chrominance, and it can vary the vector phase without affecting the other 15 vectors.

The photos of the drive-in restaurant (page 118) illustrate this feature. The dress of the woman in the foreground was yellow in the original scene, but the desired color was white. With the track ball, the grabber automatically assigned the correct controls to the colorist for adjustment. The dress color was changed from yellow to white without affecting colorimetry in the rest of the scene.

Operational features

Scene detection can be a time-consuming task. The da Vinci automatically detects scene changes by taking video samples from each frame and comparing them with the previous frame. If the amount of change exceeds a predetermined threshold, a scene-change alert is made.

It is easy to locate a particular scene because each can be identified in several ways, such as by scene names or numbers, last mark point, film start, event number or frame count. It's much easier to remember a name such as "night scene" rather than "scene 137." The operator can name and comment on each scene.

Efficient machine control is critical to any color-correcting system. One set of motion controls directs both the source and transfer decks. In addition, a touch-sensitive strip provides variable-speed shuttle, focus and framing adjustments.

Microprocessor control

The color corrector uses a Motorola 16-bit internal processor and a 32-bit external processor, both operating at 10MHz. Three Rockwell 6511 microprocessors are dedicated to specific subtasks, which keeps the master processor from becoming bogged down by the large number of real time events that must take place.

An internal modem allows the system to be interrogated by the factory in case problems develop. Software updates also can be ported through the modem. An internal 20Mb hard disk stores all system and session parameters. Session lists are stored on floppy disks.

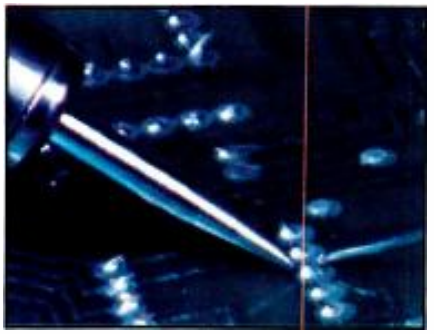
The da Vinci color corrector has been a valuable asset to our studios. Installed more than a year ago, the system continues to provide excellent service and high quality. If your facility is interested in sophisticated color-correcting techniques or post-production work, give the system careful consideration.

Acknowledgment: Portions of the material in this article were obtained from "Scene-by-scene color correction: The next generation," by Michael L. Orsburn, *SMPTE Journal*, August 1986.

Editor's note: The field report is an exclusive **BE** feature for broadcasters. Each report is prepared by the staff of a broadcast station, production facility or consulting firm.

In essence, these reports are prepared *by* the industry and *for* the industry. Manufacturer's support is 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 or disapproval by **Broadcast Engineering** magazine.



Split signals without sacrifice

By Jack Cunkelman

The old saying "you don't get something for nothing" is true for just about every circuit design. Achieving great specifications in one area usually means sacrificing specifications in another. This is also true for resistive splitters. To develop two outputs from a device with only one output, a resistive splitter pad usually is needed.

A typical resistive splitter circuit is shown in Figure 1. It is simple and has flat response and no distortion, but it sacrifices isolation. With the 6dB splitter pad, you get only 6dB of isolation. If somebody in the other control room accidentally puts tone into the second output, you have tone on your output.

Lattice-splitter pads

Achieving high isolation often requires the use of multiple active outputs (multiple amplifiers) or resistive buildouts from a low-impedance source. However, you can split signals and get isolation, simply and without amplifiers, with the lattice-splitting pad shown in Figure 2.

When I first ran across the circuit, I breadboarded it just to try it. The results were amazing. The two outputs are well-isolated from one another, and yet, only 6dB of loss exists from the input to each output. If you open or short one of the outputs, the level at the other output does not change. It is still 6dB lower than the input. A signal accidentally applied to one of the outputs will be 40dB down at the other output—not bad isolation from a couple of resistors.

As with any passive splitter, the lattice-splitter also can be used as a combiner. A stereo signal can be combined for a mono sum without sacrificing the stereo separation. This is a handy device for TV stations.

The three resistor values are the same as the circuit impedance. In most cases, this will be 600Ω. It is a balanced circuit, so all sources and loads also should be balanced. Finally, the pad inputs and outputs must work into devices that present the correct terminations for maximum isolation. Build one and try it yourself.

Active combiner

A variation of the basic passive design is shown in Figure 3. The active circuit allows you to bridge across the signal

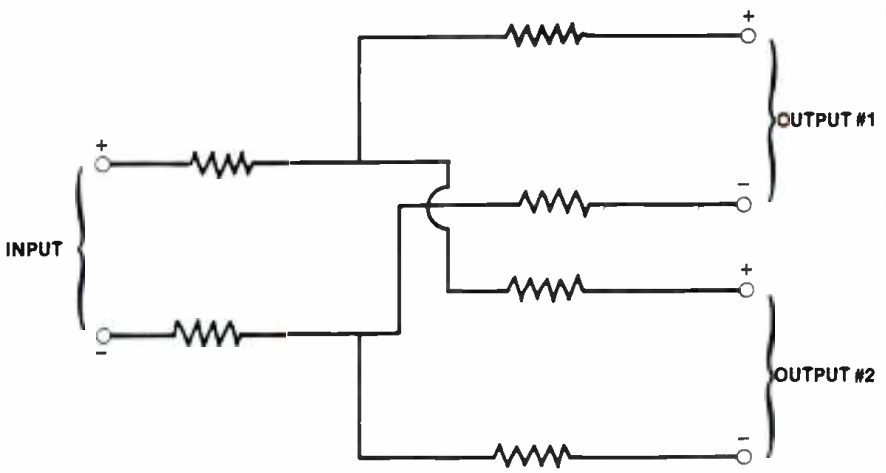


Figure 1. The resistive splitter pad provides only 6dB of isolation between outputs.

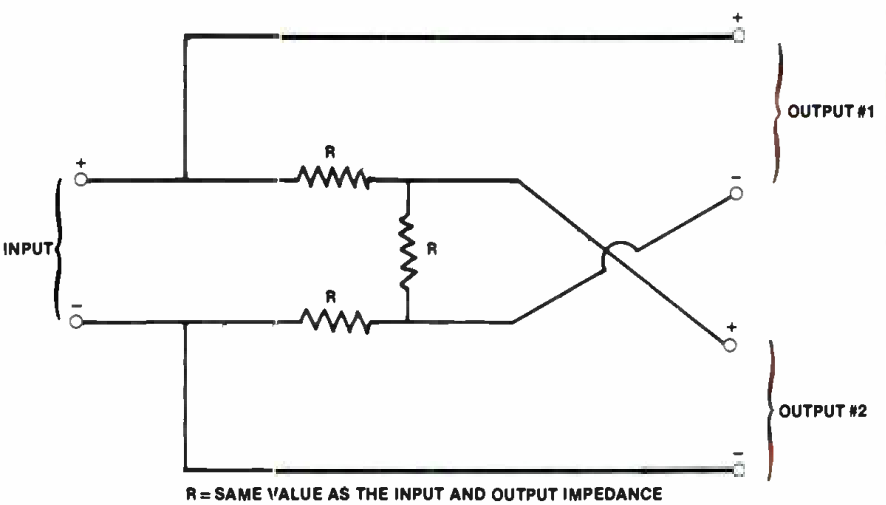


Figure 2. The lattice-splitting/combining pad has 6dB of loss, but provides 40dB of isolation. This is far better performance than that available from a standard resistive splitter.

Cunkelman is supervisor, planning and new installations, at WLWT-TV, Cincinnati, OH.

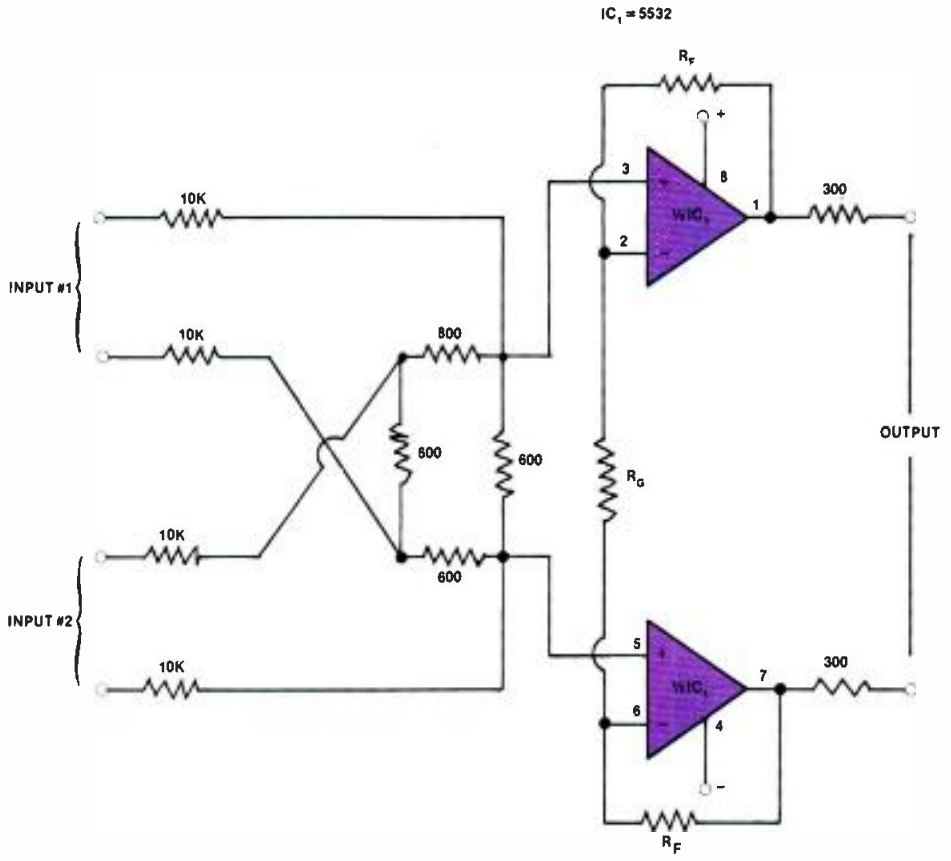


Figure 3. This simple circuit acts as a variable-gain, high-impedance combiner. The circuit parameters are described in the text.

source and also compensates for the bridging resistor loss. Almost any op-amp can be used. I had good luck with the 5532 series, designed to drive low-impedance loads.

The circuit gain can be calculated from the formula:

$$Av = 1 + 2Rf/Rg$$

The gain resistor, Rg, can be variable, and the circuit gain can be trimmed for unity. With 10kΩ resistors for Rf, Rg can be varied from 20kΩ to 200Ω, producing a voltage-gain range of 2 to 100.

Editor's note: The author has offered to provide circuit boards for the circuit at a nominal cost. For more information, contact Jack Cunkelman at P.O. Box 397, Milford, OH 45150.

McKain plans to build on the past

By Bob Van Buhler

New officers and directors were installed at the SBE annual meeting, held Nov. 10 at the second national convention in St. Louis.

Jack McKain, former vice president, was elected president, succeeding Richard Rudman. Robert Van Buhler became the society's 21st vice president and was present along with treasurer Bill Harris of Denver and secretary Richard Farquhar of Columbus, OH, to accept honors for their new positions. Directors installed included: Phil Aaland, Tucson, AZ; Terrence Baun, Milwaukee; Dane Erickson, San Francisco; David Harry, Silver Spring, MD; Larry White, Tulsa, OK; and Tom Weems, Los Angeles.

In his acceptance speech, the new president reviewed accomplishments during Rudman's presidency, highlighting nine points:

- Growth of the certification program and its increasing credibility in the broadcast industry.
- Formation of the Harold Ennes Foundation, which recognizes the importance of education to the engineer and to the industry.
- Improved relations with other professional societies and better standing with the Federal Communications Commission.
- Improvements in personnel and efficiency in the national office, including computerization of operations.
- The honor of the invitation to the society to present a paper on computer-aided frequency coordination at the International Telecommunications Union in Geneva, Switzerland.
- Selection as the host organization for an industrywide tour of the People's Republic of China, to promote cultural and industrial interchange between Chinese and American broadcasters.
- SBE's aggressive and creditable record of commenting before the FCC on matters of importance to the membership.
- Continued growth of general and sustaining membership.
- The overwhelming success of the second annual national convention.

McKain then outlined the key goals of his term of office, including the relocation of the national office to the Washington, DC, area, the acquisition of a full-time executive director, and improved promotion of the society in all areas.

McKain said that today's broadcast engineer must abandon the idea that he's just a "little guy." He said a consistent program of personal goal-setting allows achievements to occur step by step, helping engineers to become the professional managers and technicians they strive to be.

McKain recommended abandoning the obsolete term "chief engineer" in favor of the more descriptive titles of "engineering manager," "director of technical operations" or "director of engineering." These titles are easier for other managers to understand, he said, and are more conducive to the image of the engineer or engineering manager as a peer, rather than as someone in the back closet who does undecipherable things.

Chapter chairmen's meeting

Chairmen and representatives from 24 SBE chapters attended the chapter chairmen's meeting and shared ideas and problems with one another. The national office provided a tutorial on chapter officer liability insurance, the corporate relationship of the chapters with the national office, and various other legal points.

The issue of the tax-exempt status of the chapters was discussed, and (then president) Rudman offered to provide the chapters with legal information and financial reporting requirements for regional conventions. In a roundtable discussion, the attendees suggested ways to stimulate attendance and membership at the local level. For example, some chapters buy lunch for each new member and host. Other chapters hold joint meetings with other societies and complementary groups. Chapters also are stimulated and motivated by working on a project that involves the members, such as the Chapter 9 Golden Scholarship Fund.

Newly elected president McKain discusses the past successes and key goals of the society in his acceptance speech.

1988 convention dates

The board of directors took advantage of a schedule change at the Denver convention center to adjust the dates of the 1988 SBE national convention to Thursday, Sept. 22 through Sunday, Sept. 25.

The original dates, Sept. 20-23, are during the week, which would have required arrivals and departures on working days within that same week. Such a schedule would not have allowed for Saturday night stayovers, which often bring the best discounts on air fares and hotel accommodations. A Saturday night stayover can result in air-fare reductions of $200 or more.

The new dates are more convenient for the engineer who finds it difficult to schedule large amounts of time off during the week. Many attendees will find it a good opportunity to add a couple of vacation days to the convention schedule and stay over in the scenic Colorado area. The exhibitors also gain an additional day to showcase their equipment and services.

Van Buhler is chief engineer for WBAL-AM and WIYY-FM, Baltimore.

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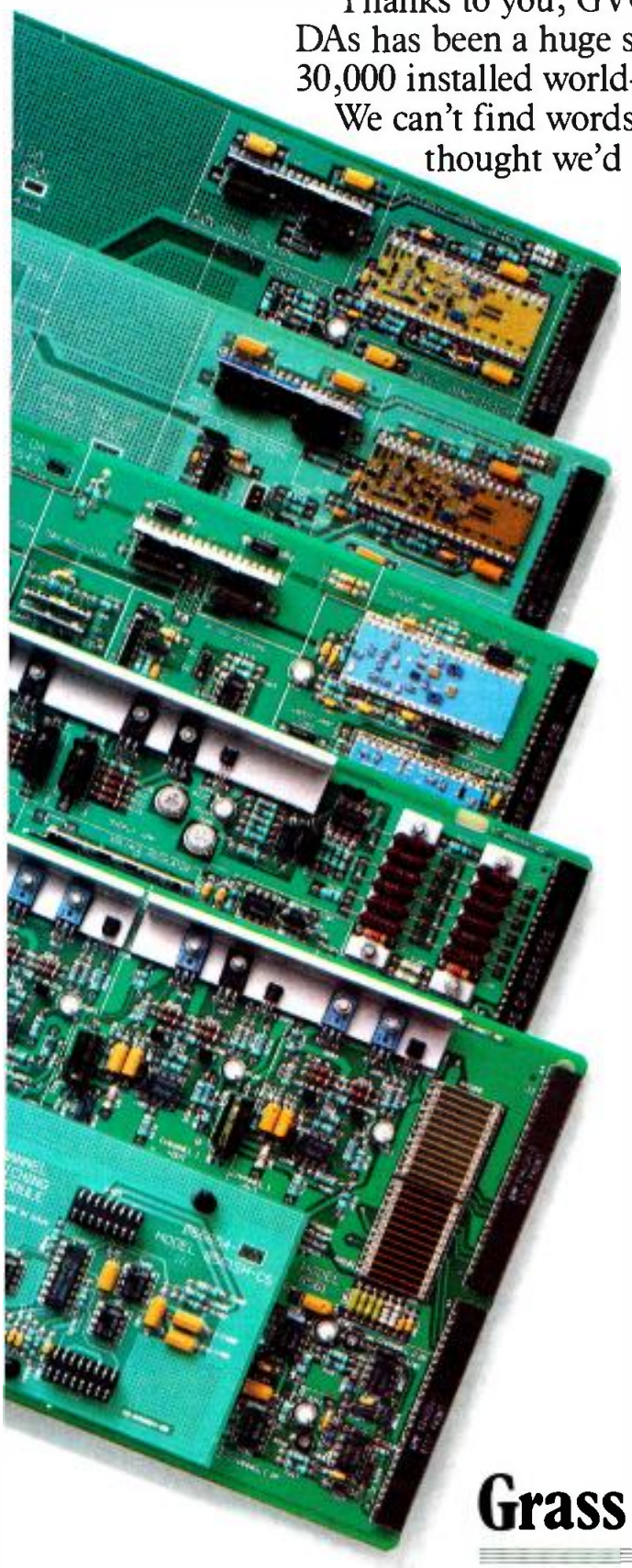

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8502 Equalizing DA

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8503 Precision DA

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8551 Audio DA

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News
Continued from page 4

Broadcast '87 was aimed primarily at German-speaking engineers and middle management, with emphasis on practical applications and demonstrations.

The next Broadcast fair will be held in the fall of 1989. The biennial event has been scheduled at that time to avoid direct conflict with Montreux and IBC.

Inside the CCIR

By Robert A. O'Connor

Morse code was designated as the international telegraphic alphabet in 1865 at the first meeting of the ITU (International Telecommunications Union). The ITU, based in Geneva, Switzerland, is a specialized agency of the United Nations with technical issues handled by two consultative committees. The CCITT deals with telephone and telegraph communications. The International Radio Consultative Committee (known commonly as CCIR from its initials in French) specializes in all areas of radio communications. Thirteen groups constitute the CCIR, including: study group 10 (Broadcasting Service, Sound), study group 11 (Broadcasting Service, Television), and the CMTT, a joint CCIR-CCITT study group concerned with long-distance transmission of radio and TV signals.

The CCIR's goal is to produce *recommendations* for international standardization of systems to ease problems of program exchange. Because of communications satellites, alternate distribution media and deregulation of telecommunications in many countries, radio and TV services have become global in nature. Logically, the concept of international standards becomes an even more desirable goal.

The organization

The CCIR structure includes Director Richard C. Kirby, an American now in office for a third term. Kirby began his broadcast career as an assistant chief engineer at KFEQ, St. Joseph, MO. The director oversees a membership primarily of administrations (governments) of participating countries. Non-voting classes of membership include recognized private operating agencies, scientific/industrial organizations and international organizations.

U.S. CCIR activity is administered through the State Department Bureau of International Communications and Information Policy, headed by Ambassador Diana L. Dougan. Of that bureau, Richard E. Shrum chairs the U.S. CCIR National Committee. Other notables on the national committee include John W. Reiser, FCC, chairman of Study Groups 10 and 11; and David Carson, Bell Communications Research, chairman of CMTT.

It is worth noting that such organizations as SMPTE, AES and their counterparts in other countries provide input to the work of the CCIR. Their input is shared through the approved representatives of each country.

Activities

Although CCIR work is effectively continuous, the organization operates in 4-year cycles, the product of a cycle being the publication (most recently in 20 volumes) of final text adopted at the cycle-end Plenary Assembly. The content of the volumes is intended to be a compilation of *hard facts* and does not include, except by reference, articles published in the technical press or material of purely theoretical interest with no direct bearing in CCIR texts. The English language edition volumes are bound in green, giving rise to the name of the "green books."

The material contributed to the CCIR from some 60 regularly participating organizations is overwhelming. During the 1982–1986 cycle, approximately 415 *input* documents were submitted to study group 11 alone. Fortunately, an orderly procedure allows the vast number of documents to be processed through small working groups and drafting parties. The procedure is followed at an interim meeting and again at a final meeting about two years later. The output of the interim meeting is a study group document called the "green booklet."

The final meeting is followed by a Plenary Assembly in which little technical discussion occurs, and texts adopted at the final meeting are approved with little or no change. An exception to this occurred in study group 11, regarding HDTV, at the 1986 Plenary Assembly in Dubrovnik, Yugoslavia. A comparable situation occurred at the XI Plenary Assembly (Oslo, Norway, 1966), when agreement on one standard for color television could not be reached.

To counteract the time span between interim and final meetings regarding subjects with rapidly developing natures, the interim working party or joint interim working party (if more than one study group is involved) can be created. Much of these groups' work is done via correspondence, but international meetings are held. HDTV, digital videotape and digital interface standards activities are areas for which several meetings were held during the last cycle. In addition to this normal CCIR process, the organization participates in special and conference preparatory meetings to provide technical support for ITU administrative conferences dealing with spectrum issues. |:-)))|

O'Connor, a member of the U.S. delegation of CCIR matters, recently retired as vice president, transmission and staff engineering, CBS.

John F. Reno has been promoted to chief operating officer for Dynatech, Burlington, MA.

Thomas Shay has been promoted to director of corporate communications for Fuji Photo Film USA, Elmsford, NY.

Teri Sosa has been promoted to marketing communications manager for the magnetic tape division of Agfa-Gevaert, Ridgefield Park, NJ. She is responsible for creating and implementing all marketing communications, including sales promotions, advertising, public relations, trade shows and technical/sales support materials.

Dave Burns, **Tom Harle**, **Jeff Detweiler** and **Chuck Rockhill** have been appointed to positions with Allied Broadcast Equipment, Richmond, IN. Burns has been promoted to national marketing director, a newly created position. Harle has been promoted to national sales manager. Detweiler is sales engineer for the Northeast quadrant. He is responsible for servicing accounts in New York, New Jersey, Philadelphia, Washington, DC, and surrounding areas. Rockhill is director of systems sales.

Larry Lamoray, **Arnie Toshner** and **Tim Wilson** have been appointed to positions with Amek/TAC USA. Lamoray is general manager. He oversees sales and support of Amek and TAC products in the United States. Toshner is national sales manager for TAC products. Wilson is national sales manager for Amek products. **Carl Reavey** is product manager for UK TAC. He trains TAC's dealers worldwide and handles product inquiries on the TAC range from the Nottingham, UK, office.

Ross Caston, **Naomi Farrington**, **Gerry Davidge** and **Iain Roche** have been appointed to sales positions with Audio Kinetics, Hertfordshire, England. Caston is responsible for training, demonstrations and the development of new sales territories. Farrington is sales/marketing administrator. Davidge is export administrator. She will assist with sales administration. Roche is sales/marketing manager.

Gary Horstkorta, **John R. Borger**, **Barry Rubin** and **David Fabian** have been appointed to positions with Pinnacle Systems, Santa Clara, CA. Horstkorta is national sales manager, and Borger is Southeast area sales manager. Rubin is Eastern area manager, and Fabian is Western regional sales manager.

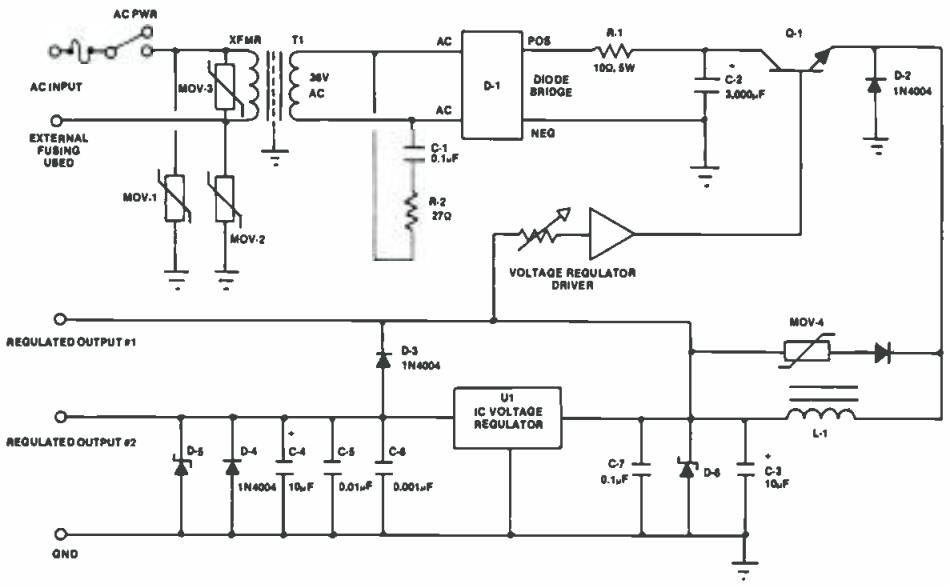


Figure 19. The recommended transient overvoltage protection for a low-voltage power supply. A circuit such as this will survive well in the field despite frequent transient disturbances.

Important correction

An error occurred in Figure 19 on page 74 of the November issue article, "Controlling ac Line Disturbances" ("Circuit-Level Applications" section). The part number shown on the diagram for MOV-3 is incorrect. The correct part number for MOV-3 should be V130LA20B (the same as MOV-1 and MOV-2). Please make the correction on your copy of the diagram. Figure 19 is repeated here with the correct part number.

As pointed out in the article, the transient suppression examples given in Figures 19 through 24 were intended only to illustrate ways that protection can be built into equipment to increase reliability. Do not attempt to modify existing equipment to provide increased transient-suppression capabilities. Such work is the domain of the equipment manufacturer. Transient suppression must be engineered into products during design and construction, not added on later in the field.

Vincent J. Battaglia has been appointed president of the electron device group for Varian Associates, Palo Alto, CA. He is responsible for the operation of eight electron tube and solid-state device units in California, Utah and Massachusetts, as well as related activities in Canada, Europe and the Far East.

Tom Neidhart and **Peter R. Steriti** have been appointed to positions with BASF Information Systems, Bedford, MA. Neidhart is director of marketing for consumer audio, video and professional audio, video products. Steriti is national sales manager, diskettes, for the audio-video department. He is responsible for sales of the floppy disk line to audio-video retailers and mass merchants.

John A. Burtle has been promoted to vice president, product management, for Broadcast Electronics, Quincy, IL.

Irving Law, **Bernice McCullough**, **Pat Medved** and **Tim Schwieger** have been appointed to positions with BSW, Tacoma, WA. Law is chairman of the board and chief executive officer. McCullough is president and chief operating officer. Medved is vice president of sales. Schwieger is vice president of marketing. He is responsible for new product development and acquisitions, product training, trade show planning and general marketing.

Andrea Geiger has been promoted to Central and Southeastern regional sales manager for the video products division of Chyron, Melville, NY.

Sheila Holmes-Ross has been appointed regional manager of sales for Digital F/X, Santa Clara, CA.

David Neal has been appointed marketing manager for DDA/Klark-Teknik, Farmingdale, NY. He will work in the Hounslow, England, offices and is responsible for all aspects of DDA's marketing operations.

Charles Morganti has been appointed broadcast sales manager for Rank Cintel, Valley Cottage, NY. He is responsible for sales of the 4:2:2-based CCD telecine and electronic imaging products.

Tony Tudisco has been promoted to vice president, marketing, for Sennheiser Electronic, Old Lyme, CT.

Gary Rosen has been appointed director, sales and marketing, for TimeLine, New York. He supervises distribution, dealer relations, advertising and marketing, and assists in product development.

James Hansen and **Andrew Mougis** have been appointed to positions with Sony, Park Ridge, NJ. Hansen has been promoted to vice president, sales, for the professional video division. Mougis has been promoted to director of sales, professional tape division.

Gary Thursby has been appointed senior vice president of Townsend Broadcast Systems, Westfield, MA. He is responsible for management of the Austin operation, in addition to providing marketing and sales leadership.

Harvey Ray has been appointed product manager for the da Vinci color correction system for Utah Scientific, Salt Lake City. He serves as marketing and applications specialist, as well as client/manufacturer liaison.

David A. Hill has been appointed Western regional sales manager for RF transmission systems, LDL Communications, Laurel, MD.

Mark Vassallo, **Bob Dente**, **Robert Codik** and **Phillip Holloway** have been appointed to positions with LEE Colortran, Burbank, CA. Vassallo is director of dealer sales. Dente is regional sales manager for the Northeast United States. Codik is new project manager. Holloway is Southeast regional sales manager.

Leo A. Riddle has been appointed sales engineer, satellite communications products, for Microdyne, Ocala, FL. He is responsible for the sales of satellite equipment and systems in all the company's market segments, as well as working with affiliated satellite dealers.

Steven K. Wenig has been promoted to director, technical support group, for Nakamichi America, Torrance, CA. He directs technical services for home audio products, mobile sound and professional audio operations.

Joe Engle has been promoted to director of sales for the broadcast equipment division of NEC America, Wood Dale, IL.

Raymond Blumenthal has been appointed district sales manager for Panasonic Broadcast Systems, Secaucus, NJ. He is responsible for the New York and New Jersey regions.

McKenzie appoints Bunn as distributor

McKenzie Acoustics, London, has appointed Bunn International as its sole U.S. distributor. Bunn will carry McKenzie's Studio 7 and professional series drivers, which will be warehoused at its Elkhart, IN, headquarters and will be responsible for Elkhart/Goshen setting up a distribution network for McKenzie products in the United States.

New England Digital forms agreement with Analogic

New England Digital, White River Junction, VT, has entered into a joint technology development agreement with Analogic, Peabody, MA. The two companies will work together in developing a new generation of analog-to-digital converters and signal-processing products that will be incorporated into the Synclavier system.

New England Digital also has doubled the size of its software research and development team.

NBC affiliate makes Panasonic M-II switch

KPNX, the NBC affiliate in Phoenix AZ, owned by Gannett, is the first TV station in the United States to switch from Betacam to broadcast M-II equipment from *Panasonic Broadcast Systems*, Secaucus, NJ. The complete system will be in full operation at the station early next year. KPNX plans to totally convert all its operations to M-II.

The order involves more than 50 major units and includes AU-650 studio VTRs, AU-620 studio players, AU-550 field-edit recorders, AU-500 field recorders, AU-400 camera recorders, as well as support equipment.

Sony Magnetic Products sells audiotape

Sony Professional Tape Division, Park Ridge, NJ, has assumed responsibility for the sales and marketing of digital audio mastering tape. D-½ and D-¼ series open-reel digital audiotape and D-¾ digital audio master cassettes are now available from the division.

Symbolic Graphics and Lyon Lamb join forces

Symbolics Graphics Division, Los Angeles, has announced a cooperative venture with Lyon Lamb VAS, Burbank, CA. Lyon Lamb will now offer a specially designed video input/output subsystem for use with the Symbolics 3600 Animation work station, rendering it a complete, compatible turnkey paint and 3-D animation video production system.

By the turn of the century there will be 12,500,000,000 more slides to file...

Capture, store, manage, enhanc Automated Image Libra

The image boom is coming... And you need to be prepared.

Computerize your slide library with the speed and efficiency you've grown to expect from today's workplace.

The best approach? The Gallery 2000 Automated Image Library System from Rank Cintel.

The Automated Image Library

Gallery 2000 is a complete image management strategy. It's a database, still store, workstation network, graphics, on-air production and transmission tool in one.

Gallery 2000 features all the power of a mini-computer database management system, including advanced search, trafficking and file sharing capabilities.

Slide File Polyphoto Workstation

Slides are all randomly accessible, presented in high-resolution video by themselves or alongside 29 other miniatures via Rank Cintel's innovative polyphoto display. They can be shipped anywhere, anytime with just a keystroke or under automated management according to user set-up.

Compatible with 4:2:2 digital studio equipment, Gallery 2000 meets all CCIR 601 recommendations. This standard digital connection lets you create your own modular combination of hardware around the Slide File workstation, and Gallery 2000 disk controller.

Gallery grows with your imaging needs

Storage. Access. Management. Power. Gallery 2000 can be tailored to **your** business needs — today and tomorrow.

Actual Slide File polyphoto displ

Four hundred frames or millions can be stored on connected hard or optical disks, while new workstations and future technology can be added to the network at anytime.

Integrated systems of storage and workstations let you grow as your requirements dictate and your budget allows.

Who needs Gallery 2000?

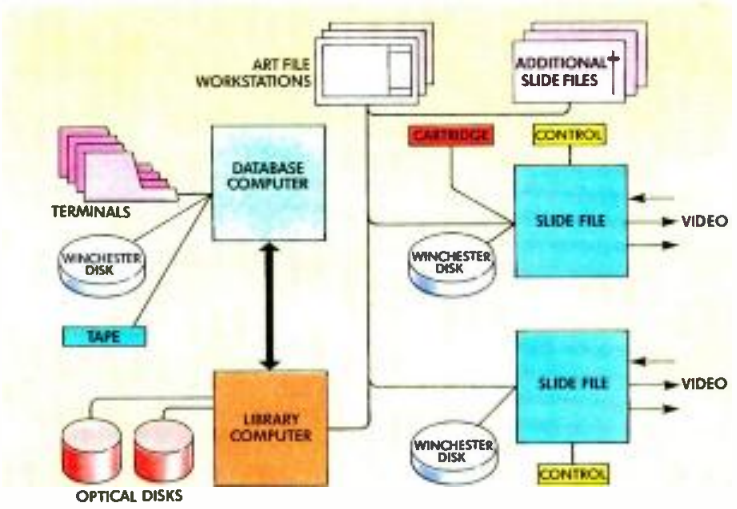
- The researcher who needs to search the slide library by title, category or even keyword; with the results listed alphabetically, chronologically or even by number of uses.
- The librarian who needs to keep track of the content of the image catalog as well as

our slides with the Gallery 2000 ystem from Rank Cintel.

A proven solution

Gallery 2000 is already in widespread use amongst leading broadcasters throughout Europe and North America.

These prestigious sites rely on Gallery 2000 daily for all their image management, storage, access and transmission needs.



It is a proven solution to a growing need.

who gains access to the database. Digital copying and transfer mean the slides themselves are never touched.

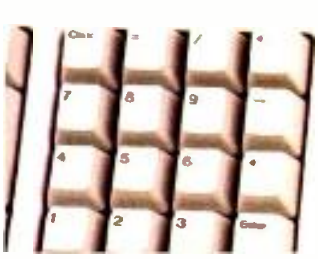
- The operator who needs access to full production effects and a system that provides programmable play lists, overnight reporting and direct-to-air transmission.
- The electronic artist who needs to tap the slide archives to retouch, montage and create stills all within the digital domain.
- The manager who needs high quality hardware and site-tested software and factory backup.

The art of electronic imaging

Rank Cintel is world-renowned for its electronic imaging products — in broadcast, post production, science and industry. Its film-to-tape technology is the recipient of an Emmy Award and numerous other distinctions. It is acclaimed for its high-resolution imaging techniques and advanced color correction technology. The Gallery system was developed in cooperation with Logica, a world leader in software and systems for broadcast, media, computer technology and telecommunications.

Rank Cintel

Imaging for the turn of the century – and beyond.



INPUT

The **ADS-80** digital slide scanner transfers 35mm slides to 4:2:2 storage with a 2048 pixel CCD line array. Features include 80-slide standard carousel for fast search, programmable color correction, cuts and dissolves; and two framestores for preview and transmission purposes. Also delivers 2X magnification without resolution loss.

STORAGE

400 slides can be stored on 8-inch hard disks, or 2800 stills can be stored on each optical disk pack. A tape streamer is also available. Gallery 2000 stores and manages up to many thousands of stills. Optical disks can be exchanged manually or in a mechanical handler for up to twenty double-sided disks. To increase the size of the library you simply buy another disk pack. Note: a typical filing cabinet holds 10,000 35mm slides while the same shelf space will hold 350,000 525/60 slides on 128 optical disk packs.

ACCESS

The **Slide File** workstation is the heart of Gallery 2000, with onboard hard disk, powerful RAM memory and unique, high resolution polyphoto screen — for browsing, storyboarding or presentations. **Gallery 2000**, with onboard hard disk, powerful RAM memory and unique, high resolution polyphoto screen — for browsing, storyboarding or presentations.

LIBRARY

The **Gallery 2000** database sequences and searches — by category, title, keywords, date of origin/use, or accession number. It reports additions and deletions. It establishes daily or weekly playlists with automated delivery to the right studio at the right time. And it lets you develop several levels of security for system access.

GRAPHICS

Art File's full-size tablet and digitizer pen supplies all popular brush effects. An onscreen color palette offers color selections. Color mixing, luminance and chrominance keying and anti-aliased artwork are standard Art File features, selected from the on-toblet menu.

PRODUCTION

The production effects console with tracker ball lets you crop, border, change colors, compose, create overlays and resize your stills. It includes unique clean-up modes to eliminate interfield flicker and reduce NTSC coding footprint.

TRANSMISSION

Go straight to air with power and confidence. Gallery 2000 automates your still sequences right before broadcast or conveniently in advance. Once the selection has been made the Library computer transfers the pictures to the appropriate studio. A printer is also attached to print-out sequence lists and other administrative information.

TAKE A CLOSER LOOK

Let Rank Cintel evaluate your image automation needs free of charge.

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My current still files include _____ slides

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—Circle (120) on Reply Card

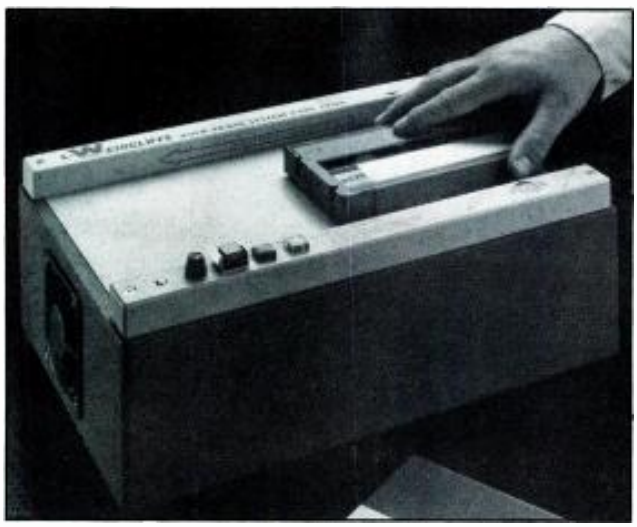
New products

Tape degaussers

Quantum has introduced the following products:

• The BTE 1925 videotape degausser features erasure better than −75dB; operation cycle time of 2.5 seconds; thermal overload protection with Conveyor Backtrac technique; and can be used for U-matic/SPH, VHS, Beta, M-II, Beta SP, 8mm and S-VHS. Photoelectric sensors determine all main functions. Forced-air ventilation in the unit provides protection for both the internal components and the tape stock during processing.

• The BTE 1905 features erasure better than −75dB on 1,400 Oersted tape; operation cycle time of 12 seconds; and can be used for M-II, Beta SP, U-matic/SPH, VHS, Beta and 8mm metal tape.



BTE 1905 tape degausser

Circle (350) on Reply Card

Software and computer graphics

Symbolics Graphics Division has introduced the following products:

• The Symbolics Recorder Software (S-Record) allows Symbolics paint and animation system users to directly control video storage devices. It works with the Lyon Lamb Mini-Vas to control videotape recorders, videodisc recorders and similar devices for unattended output of animation to video.

• An HDTV computer graphics system offers 2-D and 3-D animation and paint capabilities in HDTV format. It can be used to create 3-D images or original paint images at HDTV resolution, and can use NTSC resolution images as a part of the HDTV image.

Circle (351) on Reply Card

Broadcast equipment

Sony has introduced the following products:

• The BVP-50 CCD camera is designed to handle EFP and ENG. It eliminates vertical smear, has an electronic shutter with seven speeds and an improved S/N ratio of 60dB.

• The CCU-350 camera control unit enhances the BVP-50's adaptability to EFP. The portable CCU, with the BVP-50 and its special camera head adapter CA-50, allows full remote control with more than 300m of a lightweight multicore cable.

• Three Betacam SP videocassette decks perform playback and post-production functions. The BVW-60 Betacam SP deck is a play-only machine. The BVW-65 also is play-only, but incorporates the Dynamic tracking feature.

• The BVW-95 Betacam SP deck, designed for Betacart product applications, provides up to four audio channels using an optional audio switcher and metal particle tape.

• The BKH-3080 plug-in module provides audio noise-reduction capabilities for Sony's BVH-3000 1-inch VTR series. It offers Dolby A or Dolby SR. It does not require any extra space and needs no cabling.

• The BVM-1910 broadcast monitor features high-resolution CRT design. Its resolution is 900 TV lines.

• The BVU-950 U-matic SP recorder/player/ editor has a plug-in TBC option and is compatible with U-matic machines. The BKU-901 plug-in TBC eliminates the need for bulky cable connections between the VTR and TBC.

• The BKU-902 plug-in digital noise reducer mounts on the BKU-901 TBC to enhance the performance of the BVU-950. It has two selectable noise-reduction modes—one for normal playback and one for dubbing.

• New options and software enhancements for the MXP-3036 recording/remixing console include vacuum fluorescent light meters, a wild fader option and software.

• Three shipper cases accommodate BCT series Betacam cassettes, KCS series U-matic cassettes and KCA series U-matic cassettes.

SP BVU-950 videocassette recorder

Circle (352) on Reply Card

Chargers, battery mount, bracket kit

Anton/Bauer has introduced the following products:

• The Lifesaver MP-8 8-channel microprocessor-controlled charger features eight positions that accept any combination of 12V to 14V batteries. The microprocessor automatically identifies the size and voltage of the battery and selects the optimum charge routine and rate for each position.

• The Mobile Fast Charger can be powered from almost any vehicle that has its own +12V negative ground dc power source. It can fast charge any of the company's 12V to 14.4V Ah battery in one hour, whether the vehicle is moving or stationary, with or without the motor running.

• The Gold battery mounting system features compatibility with all existing cameras, batteries and chargers using the company's mounting system. It has a built-in 10A output connector for powering an Ultralight or other portable camera light from the battery camera.

• A bracket kit for the Sony/Ampex SP-Beta camera/recorder systems allows the user to mount the ProPac 13 batteries on the back or bottom of the recorder when used with a CCD or tube-type camera head. The kit includes a bottom-mount bracket and a back-mount bracket.

Circle (353) on Reply Card

Continued on page 136

Time Base Correction: The Third Dimension

Time Base Correction has taken on a whole new dimension with the introduction of the FOR-A FA-740 Parallel Effects TBC. A/B roll *plus* Program Output all in a single package. Three simultaneous outputs!

It's a powerful full-frame dual-channel time base corrector with independent channel freeze plus an impressive array of special effects on the program output channel. The FA-740 gives you reliable time base corrected outputs on channels A and B while simultaneously generating your mixes, mosaics, paints, wipes, cuts, dissolves and more on the program output. With unparalleled reliability and performance.

Perfect for A/B roll editing in post production suites, the FA-740 handles both 3/4" and 1/2" VTRs with or without external sync output. And the proven FOR-A analog component processing gives you the very best picture possible. Also part of this powerful package—dropout compensation, program memory capability (10 events/10 pages), and RS-422 and GPI ports for remote editing and external control.

For less than $12,000, you'll have the power of *two independent TBCs plus effects* in a single compact unit. Put it to the most important test. Your own. Enter The Third Dimension with a call to your FOR-A Dealer now.

FA-740

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Circle (97) on Reply Card

Continued from page 132

Character generator and recorders

A53-D digital special effects system

Abekas Video Systems has introduced the following:

• The CCIR 601 compatible A72 digital character generator features font attributes that may be changed instantly, including size. A screen of text may contain an unlimited number of fonts, and a single page of text may have unlimited colors displayed from the palette of more than 16 million colors.

• The A60 digital disc recorder is a real time component recording device. An SCSI and an Ethernet port are provided for digital video transfer from computer graphics devices. The recorder provides playback in forward or reverse, variable playback speeds and random access to recorded material.

• The A64 digital disc recorder is a full bandwidth 13.5MHz, 4:2:2 component digital recording system. In addition to analog ports, it is equipped with CCIR 601 digital video input and output ports. The recorder offers capacities of 50 and 100 seconds in the 525-line standard, and 30 and 60 seconds in the 625-line standard.

• The A53-D digital special effects has an optional key-processing channel and extended warp effects. The full-bandwidth 8-bit key-processing channel allows the keying of any shape and generates a drop shadow of any color and transparency for it. The warp option features effects that bend, roll and shred the picture to produce page turns and rolls.

Circle (354) on Reply Card

Graphics, election computer and still store

Dubner Computer Systems has introduced the following products:

• The GF-30 graphics factory operates in digital component video, allowing direct interface with CCIR-601 standards, as well as output in analog RGB, NTSC or PAL formats. It is based on a dual-channel, dual-operator, anti-aliased character generator.

• The 20-KEL election computer assembles and analyzes voting data, compiling running totals for each electoral race. When the election is over, with a simple change of programs, it becomes a full-featured character generator.

• The DSS-4 still store is a 4-field video capture, storage and retrieval system. Dual-channel outputs display both program and preview images. Its complete set of graphics tools for image enhancement, modification and correction can be used at the input or output stages.

Circle (355) on Reply Card

Digital equipment, editing system and teleproduction unit

IPS-100 integrated production system

Grass Valley Group has introduced the following products:

• The Kadenza real time multilayer digital picture processor comprises a control panel and controller connected to a number of video processor channels, each channel representing one layer of the final composite. Five channels may be controlled at one time, and may be any mix of Kaleidoscope digital effects channels and new switcher channels.

• The DDA-101 digital distribution amplifier has a standard video-present LED to signal that valid digital video is present at the input, eliminating the need to externally monitor input video. A 1-rack-unit tray holds two DAs, and a 2-RU tray holds four DAs.

• The DRS-510 16x8 parallel digital routing switcher with 10-bit capability and signal reclocking can be integrated with the existing 20-TEN family of compact analog video and audio routing switchers. The building block of the router is 16x8, with initial capability for expansion to 16x16.

• The VPE-141 editing system incorporates all computer electronics including drive controllers, memory, processor, I/O ports and XGPI on a single PC board. It features the capability for booting the operating program from battery-backed CMOS memory.

• The IPS-100 integrated production system, a compact, full-capability teleproduction unit, features a system of rapid editor control called JOG PAD. Simply moving a finger along the pad surface controls all tape movement for editing.

Circle (356) on Reply Card

Frame synchronizer

Harris Video Systems has introduced the 634, which features a digital noise-reduction system and RGB circuitry for high-quality picture reproduction. It offers independent chroma and luma noise reduction for improving color and black-and-white picture quality.

Circle (357) on Reply Card

Encoder and CCD camera

Hitachi Denshi America has introduced the following products:

• The Super Encoder improves transmitted TV picture quality by enhancing luminance signal information with four specialized correction circuits. It makes it possible to transmit a picture signal with improved resolution in areas of high-color saturation, in dark portions of the picture and with enhanced overall detail.

• The FP-C2 is a 3-chip CCD camera designed to dock directly to the Betacam component recorder, as well as other recorders using a docking adapter. It features 620 lines of resolution and a 57dB S/N ratio.

FP-C2 CCD camera

Circle (358) on Reply Card

Cameras

Ikegami Electronics (USA) has introduced the following products:

• The HL-791 camera is designed to dock with either Betacam or M-II VCRs for 1-piece camcorder operation.

• The EC-1125 HDTV camera has user-features including a family of fixed focal length lenses and a selection of zoom lenses, mat boxes, major hook and other cine accessories.

• The CCD-770 and HL-379A CCD cameras use a 3-chip design, high-speed prism optics and an electronic shutter.

• The ITC-735 tube design camera incorporates Saticon IV tubes and has a 4-camera CCU.

Circle (359) on Reply Card

Routing switcher and enhancement

Utah Scientific has introduced the following products:

• The DVS-1 digital video routing switcher features a 32x16 matrix in a single-card frame with expansion to 128x128, loop-through inputs, dual outputs and 10-databit signal handling. Redundant power supplies and control cards are available.

• The da Vinci color correct system features enhancements including a joyball control option, a CMX-compatible 8-inch floppy drive option, field-accurate scene detection for tape-to-tape color correcting and several additional internally generated video test signals.

Circle (360) on Reply Card

Hardware and software

Cubicomp has introduced the following products:

• The Render Acceleration Compute Engine (RACE) for its Pic-

tureMaker 3-D computer graphics systems. It enables PictureMaker users to improve their rendering time up to 1,500%. This option allows the system to operate approximately 15 times faster than an 80286-based computer.

• RACE can be added by itself to PictureMaker, or as a part of the PictureMaker Tape Render Station, a fully operational render and output station. With the station, the rendering operation can be offloaded from the main system, leaving it free for modeling, motion scripting and paint operations.

• Also for PictureMaker, optional paint and animation software includes an enhanced version of True Color Paint, called Version 2.0, and True Color Animation. Version 2.0 enhancements include user-specified grades, transparent masks, soft transparent brushes in a range of shapes and sizes, color key fills and embossing. True Color Animation provides traditional cel-by-cel animation techniques for 2-D images.

• Two PictureMaker systems, the PictureMaker/60 and PictureMaker/50, feature a 24-bit frame buffer and an 80386-based microprocessor. The PictureMaker/60 includes the buffer; CPU with 80387 math coprocessor; and 1.2Mb floppy disk drive and 40Mb hard disk; 3-D modeling, imaging and animation software; True Color Paint and True Color Animation. PictureMaker/50 includes the buffer, CPU and peripherals, 3-D modeling and imaging software and True Color Paint.

• The line of Vertigo V2000 3-D computer graphics systems can do design, production and rendering tasks simultaneously, working together or as stand-alone work stations.

• The V2000 software allows the work to be distributed automatically and transparently among the nine Render Accelerators in the V1100 expansion render engine. A dedicated parallel processor manager ensures that all processors receive an equal workload.

Circle (361) on Reply Card

Still store, frame store/TBC

The Centaurus digital still store

The Alta Group has introduced the following products:

• The Centaurus, a full-bandwidth digital still store and retrieval system, offers special effects, A/B roll video switching, stereo audio mixing and dual infinite window time base

correction/frame. It is designed for Y/C 3.58 component processing, making direct interface with the S-VHS format automatic.

• The Pyxis-E, a dual-channel frame store/TBC with effects, features a full frame of memory in each channel, which provides it with dual independent freeze frame/freeze field capability. The unit offers five stereo audio inputs and the capability for switching, mixing or fading the 2-channel audio signal along with the video.

Circle (362) on Reply Card

TBC, CCD camera, studio recorders, switcher and shipper

Ampex has introduced the following products:

• The TBC-7 extended performance time base corrector features variable speed playback and time/compression/expansion without picture bounce or blur; digital velocity compensation; and elimination of picture shifts caused by non-color-framed edits. It is compatible with the family of Ampex type C studio VTRs plus the VPR-2 and VPR-2B models.

• The CVC-50 3-chip CCD camera features frame-interline transfer CCD sensors and switchable electronic shutter. A switchable dynamic contrast control compresses the highlight signal.

• The CVR-70 studio recorder, CVR-65 studio player with AST tracking and CVR-60 studio player each feature the extended performance Betacam SP video format. Although compatible with existing Betacam equipment, they can use metal or oxide tape, up to 90-minute cassettes, and have four audio channels when using metal particle tape.

• An 18-input version of the AVC Vista series switcher is designed for off-line editing suites and mobile units. Two linear keyers in the mix effects have full-length independent key switching buses, each capable of luminance, ISO (external), composite chroma and RGB chroma keys.

• Constructed of a high-impact, flame-retardant plastic, the 1"x10½" shipper is designed for 196 1-inch broadcast video mastering tape. The shipper features a built-in turntable.

The TBC-7 time base corrector

Circle (363) on Reply Card

Digital effects enhancements

Digital Services has introduced additional features for its Eclipse optical digital effects system, including modes for twist and curved effects and the page turn and page scroll option.

Circle (364) on Reply Card

TBC, frame synchronizer and memory system

FA-740 time base corrector

For-A Corporation of America has introduced the following products:

- The FA-740 parallel effects time base corrector offers full-frame dual-channel capability with independent channel freeze, plus special effects for professional A/B roll editing. It can be operated as two independent TBCs, and handles ¾-inch U-matic VTRs and ½-inch VTRs with or without external sync output.
- The FA-800 Autocor frame synchronizer and full-bandwidth TBC with automatic level control offers compatibility with the SP format. It also has the capability to handle 1-inch VTRs without sync head.
- The Sirius-100 digital audio memory system combines 16-bit digital recording and hard disk technology, storing commercials, sound effects and related program material on a dedicated hard disk, providing instant random access to any cut or other material. It is an automatic sequencer for radio, and an audio editor for radio, TV and motion picture facilities.

Circle (365) on Reply Card

Work station, distribution and switcher equipment and multirole camera

BTS Broadcast Television Systems has introduced the following products:

- Off-line satellite work stations work with the FGS-4000 or FGS-4500 to off-load modeling and rendering tasks and provide high-resolution output. The work station is a stand-alone system that operates on SUN microsystem hardware and communicates with the FGS over Ethernet.
- The 350 series generation of signal-distribution and switcher equipment handles analog component, HDTV and multiplexed analog component signals. The video distribution amplifier and small switchers (10x1 and 20x1) can handle up to 30MHz with full slew rate. The audio distribution amplifiers, as well as the audio portion of the switchers, can handle

sources including compact disc and digital audio. The rack frame with integrated power bus provides the flexibility to plug in the power supply in any slot. Audio and video power supplies are switch-mode power supplies.

• The LDK 54A multirole camera system works in ENG, EFP (triax or multicore) modes, as a self-contained battery-powered unit, or in a plug-compatible combination with LDK 6 family of cameras. It also is a complete camera-recording system with full-production facilities.

• The full-definition, anti-aliased, foundry-based fonts for the Vidifont Graphics V/Viditext II integrated graphics system. Complementing these fonts is the downstream keyer offering 16-level interplane keying between internal text and background planes, the GraphicStore Paint and Library system and external or program video. The keyer provides an anti-aliased keying technique that mixes electronically generated graphics with external video.

Circle (366) on Reply Card

Monitoring instrument, enhancement board, software and Super VHS products

Comprehensive Video has introduced the following:

• The Time-Code Sync Monitor takes an NTSC video signal and provides displays on the user's own video screen. It has two additional outputs for display on a TV waveform monitor.

• The Fonts-Plus add-on enhancement board to the company's PC-2 character generator for IBM PC-compatible computers adds the capability for storing and retrieving character fonts directly from disk. The board incorporates Font/Logo Compose software with which the user can create custom fonts. It also increases the board's selection of type styles.

• A series of PC-driven videotape editing systems software and accessories is composed of programs that are fully compatible with one another. The Edit Master cuts-only editing

Editing systems software and accessories

system works with time code, control track or a combination of both. It features list management capabilities, automatic list cleaning and auto assembly. The Edit Cutter, which also works with control track or time code, has a 900-edit internal edit memory. It allows the user to save edits on disk for transfer to an on-line system. Edit Lister, an edit list management program, is available in version 3.1. It works with existing editing systems or with lists created using Edit Master or Edit Cutter. D-Link is an 8-inch disk-drive option for users of MS-DOS computers. It takes lists created by Edit Master, Edit Cutter or Edit Lister and transfers them to CMX-compatible 8-inch disks. The Time Code Reader Card, an option for Edit Lister, reads time code directly from tape. Users can mark in and out points while viewing footage or editing with a control track editing system.

Circle (367) on Reply Card

Enhancements and work station

Pinnacle Systems has introduced a series of graphics and features for its 2000 and 3000 computerized videographic work stations. Standard features include reflectance mapping, hierarchical animation functions, Boolean functions and field animation.

• The Super V-1000 desktop video work station is S-VHS and composite switchable, and will work with U-matic, Betacam and M-II. It produces transparent image quality and can process non-time base-corrected video.

Circle (368) on Reply Card

Video measurement and waveform monitor

Tektronix has introduced the following products:

• The VM700 automatic video measurement set is a video monitoring and measuring instrument that can be used for automatic monitoring, as well as for manual measurements. It makes a prescribed set of measurements, comparing each measurement to limits preset by the operator.

• The 1730 mod high-definition waveform monitor provides the necessary bandwidth to test, evaluate and operate HDTV equipment. It includes HDTV sweep speeds, accepts tri-level sync, 30MHz bandwidth, three channels and parade and overlay displays.

VM 700 video measurement set

Circle (369) on Reply Card

Signal generators

Magni Systems has announced the following products:

• The 1510A NTSC test signal generator features stereo audio tone, gen-lock and character ID, as well as additional standard signals for a total of 40, all switch-selectable from the front panel. A field sweep to 6MHz is a standard signal, eliminating the need for a separate instrument.

• The 1510S is a simplified unit offering 16 NTSC signals.

• The 1517 component test signal generator supports RGB formats and CAV formats, including EBU, Betacam, Y/CTCM and Y/CTDM. More than 24 signals are available from 16 front-panel buttons.

• The 4030 videographics system consists of two plug-in cards for an IBM or compatible PC. The advanced graphics coprocessor lends drawing speeds of up to 60 million pixels per second and a 16.7 million total culor palette to a wide range of PC graphics software packages. The gen-lock/encoder card encodes the RGB output to NTSC or PAL standards, fully gen-locking the PC graphics internally or to a reference input.

The 1510A NTSC test signal generator

Circle (370) on Reply Card

Graphics systems

Microtime has introduced the following products:

• The Ani-Maker and Image-Maker are full-featured systems for production and post-production in television, print and slide graphics. The Ani-Maker is a complete work station for the creation and animation of 3-D models. Integrated paint is standard to allow creation or modification of images.

• The Image-Maker has all the features of the Ani-Maker and adds an off-line rendering station to increase the system productivity. A local area network is used to interconnect the CPUs.

Circle (371) on Reply Card

Electronic editing system

Montage Group has introduced the Montage Picture Processor System II, which features increased flexibility in film-edge number recognition. Also, worktape functions have been improved to speed up the process of building and recording workprint, and software has been developed to support hardware configurations. The system is fully compatible with existing Montage processors.

Circle (372) on Reply Card

Work stations, machine control system and videocassettes

3M has introduced the following products:

• The Silver videographic work station provides layout functions, a video special effects generator, text generator, paint system still store and VCR controller. The expandable system offers real time video digitization in 65,000 colors.

• The Specter 3-D modeling and animation work station interfaces with a complete video input and output system. The integrated system is designed to bring greater productivity to the creation of animated graphics for NTSC and PAL video applications.

• The ESbus broadcast control system provides control of serial or parallel machines.

• The MM series M-II master broadcast metal particle videocassettes, designed for operation with M-II-format equipment developed by Matsushita, are available in 20-minute small shells, and 10-, 30-, 60- and 90-minute in the large shells. Dustproof, book-style album cases are available for the ½-inch videocassettes.

• The PB series Betacam SP master broadcast videocassettes, designed for equipment developed by Sony, are offered in 5-, 20- and 30-minute lengths in standard-size Betacam cassettes, as well as 60- and 90-minute versions in a large shell.

The PB series Betacam SP videocassettes

Circle (373) on Reply Card

Digital video system

Digital F/X has introduced the DF/X 200 digital video production system, which features real time 3-D digital effects, high-resolution type font generation and 2-D paint tools in a single, integrated unit. Its architecture offers universal input-output transcoding to accommodate the various analog and digital video formats.

Circle (374) on Reply Card

Paint systems and color graphics system

Quanta has introduced the following products:

• The Quantapaint 32 paint system software offers a combination of painting, drawing and special effects functions, selectable from

the graphics tablet. It features 14 drawing tools.

• The QVP-100 and QVP-200 are PC-based paint systems. The QVP-100 allows users to transform their IBM XT-compatible PCs into full-featured paint systems, while the QVP-200 offers the same capabilities in a stand-alone configuration.

• The Artista system is a full-color graphics system that provides paint, 3-D modeling and animation capabilities. It features a flash digitizer, user-definable brush types and 16.7 million colors.

Circle (375) on Reply Card

IFB system

Alpha Video & Electronics has introduced the News Connection IFB system, which allows reporters to page a director from any remote location and achieve confidential, handset-to-handset communications. It also provides director access to as many as five separate lines simultaneously with program audio cues to one or all locations.

Circle (376) on Reply Card

Character generator and color encoder

Laird Telemedia has introduced the following products:

• The 1450 character generator features 35ns resolution, 65,000 simultaneously displayable colors, six resident fonts, 100 pages of internal memory, built-in NTSC color encoder (encoded or RGB outputs), chassis and keyboard. Standard character enhancements include italics at one of seven angles, edging with full edge, outline, four quadrants of drop shadow and eight intensity levels.

• The 1032 NTSC color encoder incorporates a single-chip encoder

1450 character generator

that modulates on the R–Y, B–Y axis. It converts component RGB video to composite NTSC video, producing a signal consisting of sync, color burst, chroma and luminance information.

Circle (377) on Reply Card

PC-link option

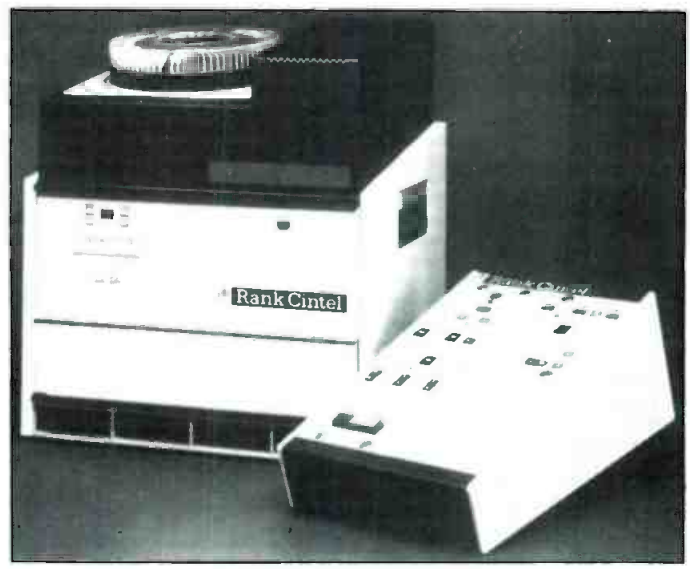
Videomedia has introduced the PC-LINK option for the MICKEY

series of editing systems. It allows the user real time bidirectional communications with any IBM AT or XT series compatible computers. The user can store and retrieve edit decision lists of up to 999 events to and from the computer's floppy or hard disk system.

Circle (378) on Reply Card

Digital slide scanner

Rank Cintel has introduced the ADS-80, which is capable of direct on-air broadcast or transfer to digital still store. It provides high-resolution CCD scanning of 35mm slides with a 2,048 pixel CCD line array.



Circle (379) on Reply Card

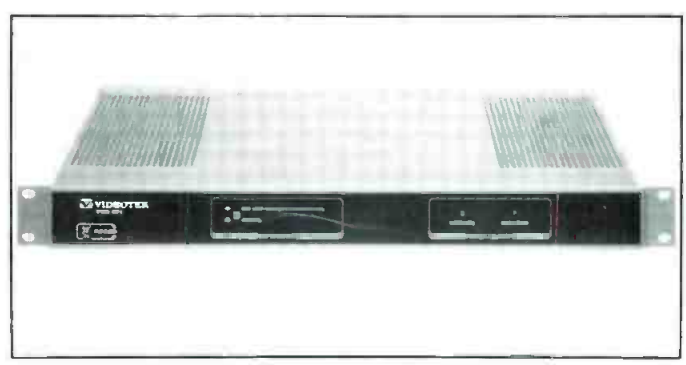
Serial control unit

Timeline's Lynx System Supervisor provides an interface for devices with differing serial communications protocol, as well as providing control of tape machines and sprocketed transports through Lynx time-code modules and Lynx film modules. The hardware design provides multiple serial communications ports whose function and protocol will be defined by the system's software.

Circle (380) on Reply Card

Digital sync generator

Videotek has introduced the VSG-201, with long-term stability of less than 5Hz per year. It may be used as a master sync generator or gen-locked to another reference.



Circle (381) on Reply Card

Keyboard

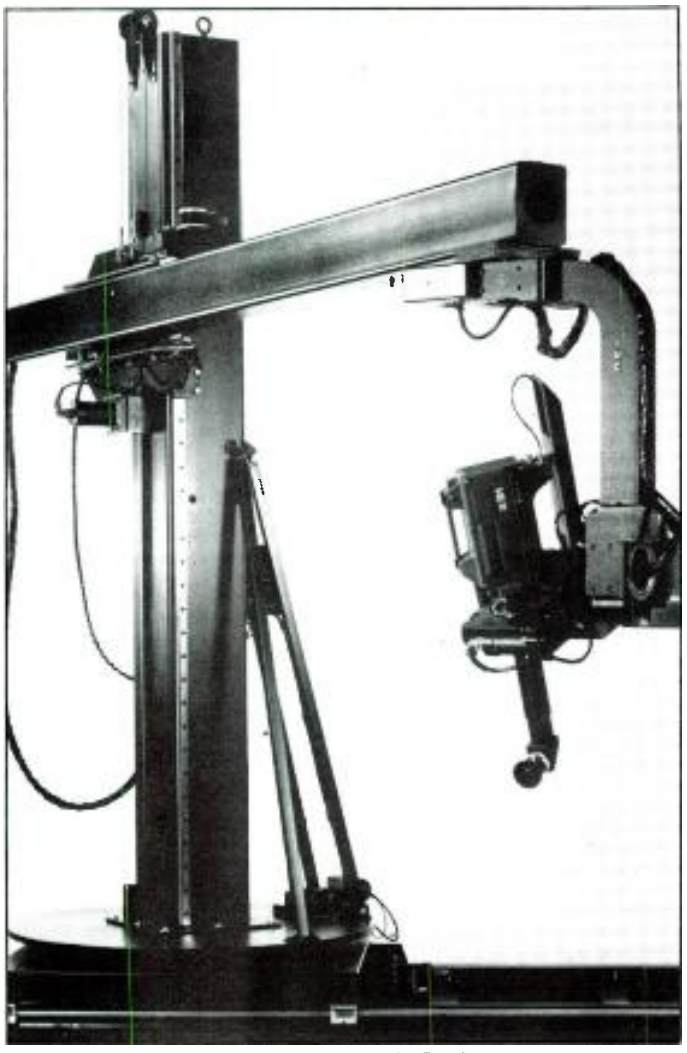
Nagra Magnetic Recorders has introduced a keyboard for the T-Audio time-code post-production recorder. All shift key functions

on the keyboard were replaced with separate dedicated keys. A numeric keypad also has been added. The T-Audio displays more information permanently.

Circle (382) on Reply Card

Camera mover system

Interactive Motion Control has introduced the Nodal-Point camera mover system for film or video. The optional periscope package allows the user to get a close-up or wide-angle perspective. The package includes wide-angle lenses down to 1.9mm.



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Switchers

Intergroup Video Systems has announced the 9600 series of video production switchers with REFEX and M4 keying system (REFEX: reprogrammable effects; M4: multi-element, multiplane, multilevel, memory key). Versions available are the 9616-1, 16-input and 1 mix/effects; the 9616-2, 16-input and 2 mix/effects; the 9624-1, 24-input and 1 mix/effects; and the 9624-2, 24-input and 2 mix/effects.

Circle (384) on Reply Card

Hardware, software

ColorGraphics Systems has introduced the following enhancements to the ArtStar 3D Plus videographics system:

- The DVM-100 real time digital mixer hardware option provides real time animation techniques with artist-generated stencils controlling the mix. Animation capabilities include dissolves between two 24-bit, full-color images; animation of

the full-color layers; transparent, color-cycled movie capability; and undo editing capability in the paint program.

• Auto-Trace, a software feature, enables the artist to draw or input 3-D graphics with a camera and automatically convert them to a 3-D model. The model can then be used with the system's paint or 3-D animation programs.

Circle (385) on Reply Card

Videographics enhancements

Aurora Systems has introduced the following products:

• The AU/280 videographics system features software and hardware enhancements that include real time animation, optional 3-D modeling features and a 340Mb hard disk. Other features include: color-cycle animation capability, a preview for the 3-D modeling program, timeline-based animation editing, an automatic storyboard feature, flexible tiling and texture fill and picture browse capability.

• The AU/75 videographics system offers an interface to the Accuweather meteorological data service. It automatically connects the system via modem to a number of weather and sports data service computers, extracts specified information, and formats it graphically on the screen.

• The AU/220 full-color videographics system offers an optional real time frame-grab capability. It also is compatible with PAL and SECAM international TV standards. The frame-grab feature allows an artist to capture full-color images from broadcast sources, including video cameras and rolling tape.

Circle (386) on Reply Card

Broadcast videocassettes

Eastman Kodak has introduced the ESP-750 ¾-inch videocassettes designed for use with U-matic SP videocassette recorders. These videocassettes are compatible with existing U-matic video recorders. They feature an advanced magnetic dispersion with the high coercivity needed to handle the U-matic SP's higher FM carrier frequency.

Circle (387) on Reply Card

Super VHS products

Crosspoint Latch has introduced the 8200C post-production switcher combined with two full-bandwidth Y–C TBCs, genlockable sync generator, audio mixer and digital effects. The combination allows the user to maintain the 400-line quality of Super VHS through the 8200C system with other peripheral equipment. The 8200B is available for users considering expanding to Super VHS, but currently operating in the composite format.

Circle (388) on Reply Card

Disk drive standard

CMX has incorporated the 3½-inch disk drives as standard hardware for its line of large-scale editing systems, including the CMX 6000 laserdisc-based editor. The drive is standard in the 330, 3100 and 3600 systems, and will be included in addition to the 8-inch disk drives in the 3400 and 3400A systems at no added cost. A retrofit kit is available for existing LSI-based systems.

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RCA PARTS: New Factory surplus parts for RCA TK28/29. TK47. CCD-1, G-LINE. and more. Includes prisms. filter wheels. VCXO's and other major assemblies. Call TVS at (609) 435-6778 for 12 page list. sorted by drawing no. 01-88-1t

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HELP WANTED

CHIEF ENGINEER needed for Miami Christian UHF Station. Strong on transmitters. Contact Ben Miller. Vice President. Engineering, Trinity Broadcasting Network. 714-665-2145. E.O.E. 11-87-4t

MAINTENANCE ENGINEER: for NBC affiliate. Need technician with experience in RCA VHF transmitters. Ampex Quads, VPR-2's, and Sony ENG equipment. Send resume. references and salary history to: KJAC. P.O. Box 3257. Port Arthur. TX 77643. Attention: Chief Engineer. EOE. 12-87-2t

WASHINGTON, D.C. AREA: Microwave System Chief Engineer. Large TV microwave interconnect system with over 14 transmitters. 2 gHz to 23 gHz, serving Washington and Northern Virginia seeks full-time Chief Engineer. Duties range from system design to system maintenance for both AML and FM microwave transmitters. System is analog television. no digital, no data at this time. Salary is competitive. Send letter and resume to: Michael Kelley, Executive Director, The Capitol Connection. 4400 University Drive, Fairfax, Virginia, 22030. An Equal Opportunity Employer. 01-88-1t

DIRECTOR, ENGINEERING SERVICES. National Captioning Institute. a broadcast related company providing closed-captioned TV services for the hearing impaired. has a new opportunity available in Falls Church. VA. The Director will be maintaining technical quality standards and providing liaison support with both broadcasting and production entities. Staffing, budgeting and training responsibilities as well as long range planning and development of technical and operational facilities. Requires broadcast experience with 3-5 years hardware and software design in computer terminal, visual display and data recording technology. B.S. in electrical engineering, computer science or equivalent. NCI offers a competitive salary and outstanding benefits package. Send resumes WITH salary history to Personnel Department. NCI. 5203 Leesburg Pike. 15th Floor. Falls Church, VA, 22041. EOE/AA. 01-88-1t

TELEVISION MAINTENANCE ENGINEER: Strong Sony tape background required. Send resume to Personnel, KPTV. PO Box 3401, Portland, Oregon 97208. EEO Employer. 01-88-1t

VIDEO ENGINEER – Immediate opening for maintenance engineer in Ohio video post production facility. Successful applicant will have component level maintenance experience in 1" tape and digital effects systems. CMX and Grass Valley 300 experience a plus. Job responsibility will include maintenance of all equip. and performance verification of plant. Minimum 3 years in broadcast or equivalent industrial television environment. Plant modification and new installation experience helpful. Send resume to Chief Engineer, Spectrum Video 688B Alpha Drive. Cleveland. Ohio 44143. 01-88-1t

VIDEOTAPE EDITOR Full service post-production company seeks full time post editor for CMX 3600. ADO. A-62, VPR-3, on-line and off-line. Computer graphics experience helpful. Resume to: Scene Three, 1813 Eighth Avenue South. Nashville. TN 37203. Attn: Joe Askins. (615) 385-2820. 01-88-1t

MAINTENANCE SUPERVISOR: New England TV Station seeks individual with maintenance experience on Sony ¾. RCA Quad and related studio equipment. Must have solid broadcasting background. Send resume to Broadcast Engineering, P.O. Box 12901, Dept. 692. Overland Park. Kansas 66212. EOE. 1-88-1t

KRIV-TV, FOX TELEVISION is seeking a qualified Maintenance Engineer. Requirements include a minimum of 5 years television maintenance experience. Applicant will be responsible for the setup and maintenance of all technical equipment associated with the station. Primary area of responsibility are 1 inch videotape maintenance and as an alternate to our primary transmitter engineer. Must have held FCC License or be SBE certified. Have background in both digital and analog electronics. Qualified applicants send resume to KRIV-TV. P.O. Box 22810, Houston, Texas 77227 Attn: Engineering Dept. No phone calls. E.O.E. 01-88-1t

HELP WANTED (CONT.)

ASSISTANT ITV ENGINEER Minimum of five years experience in maintenance repair of broadcast type equipment. Hold a valid Radio Telephone license. SBE certification desirable. Salary $2500-$3038 monthly. Anaheim City School District. 890 S. Olive. Anaheim, CA 92805 – Tel. (714) 535-6001. Ext. 250. 01-88-1t

MAINTENANCE ENGINEER: Florence, South Carolina. Progressive Company, excellent benefits. Three years minimum TV studio maintenance experience required. Extensive background in RCA Quads (especially TCR-100), Sony ENG systems and general digital systems servicing a necessity. Send resume to: WPDE-TV, Personnel Department, P.O. Box F-15, Florence, SC 29501. 01-88-1t

STUDIO/TRANSMITTER ENGINEER wanted for maintenance and repair in medium market. Good exposure to all facets of radio engineering. General License. 1-2 years broadcast experience, familiarity with IC technology desired. Nice, inexpensive area to live. Send resume to Jim Lies, C.E., WYEZ & WTRC, 237 Edison Road, Mishawaka, IN 46545. EOE M/F 01-88-1t

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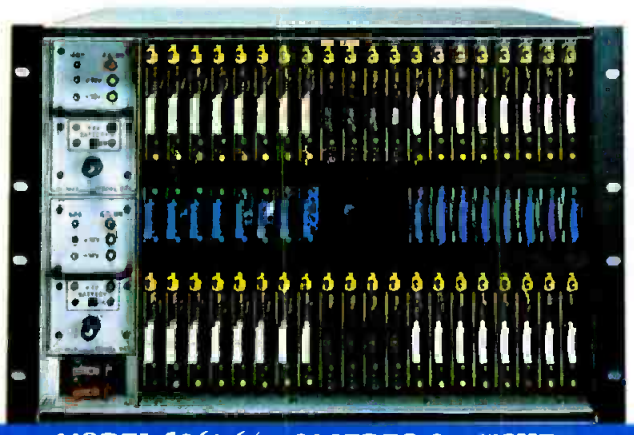

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