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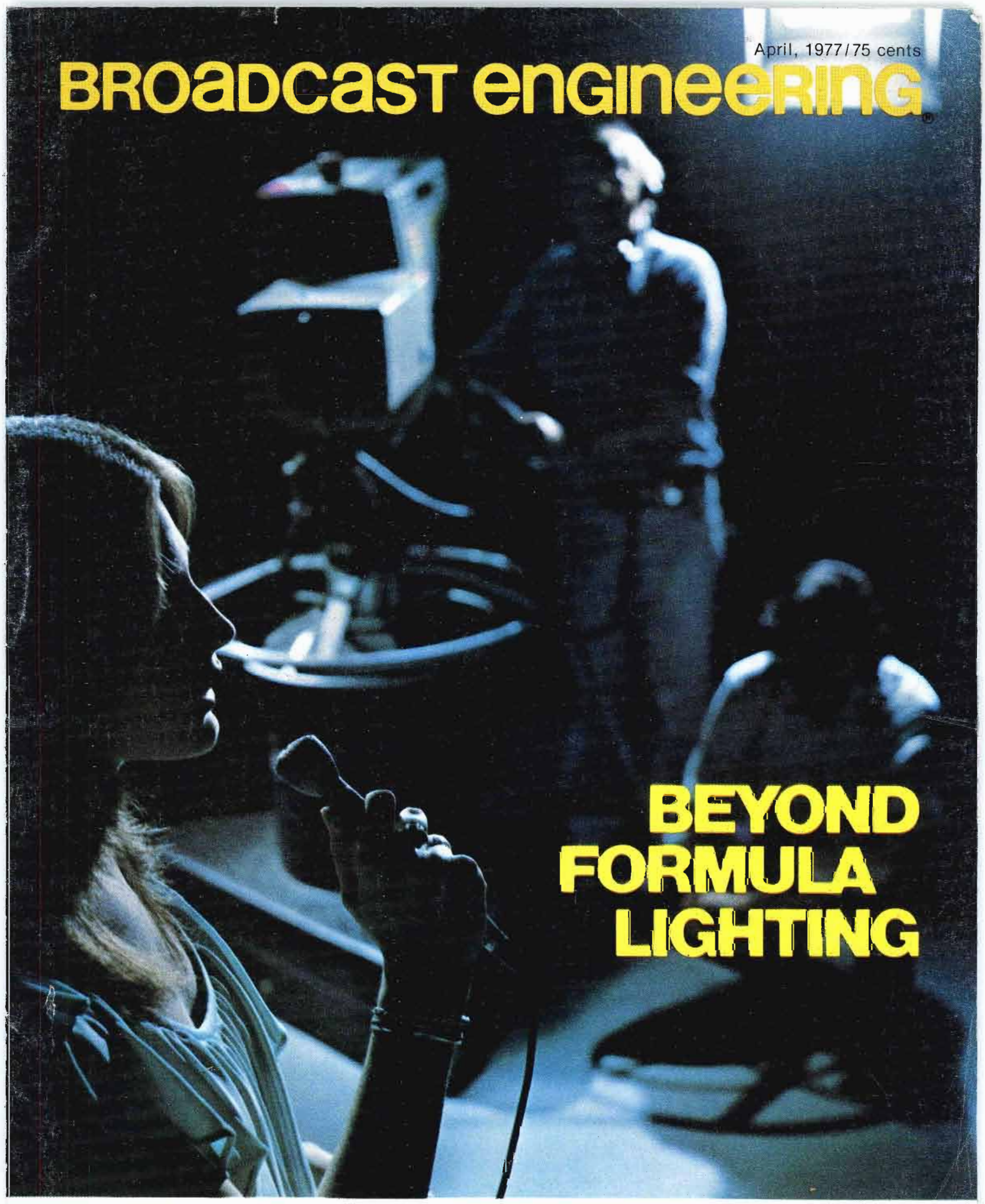

BEYOND FORMULA LIGHTING

Directional Antennas
RENG: RPU Roundup
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MCC7602

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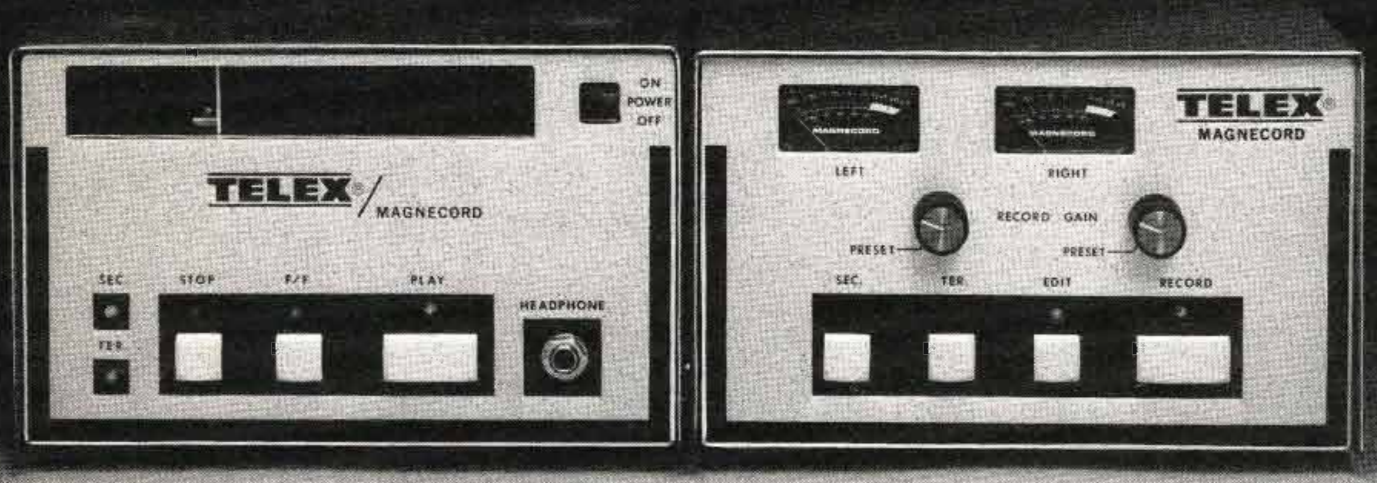

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BROADCAST ENGINEERING®

The journal of the broadcast-communications industry — *April, 1977 Volume 19, No. 4*

About the cover

The challenge of lighting for unusual effects and for hard to shoot scenes begins on the cover and continues on page 14. Cover photo by Ron Whittaker.

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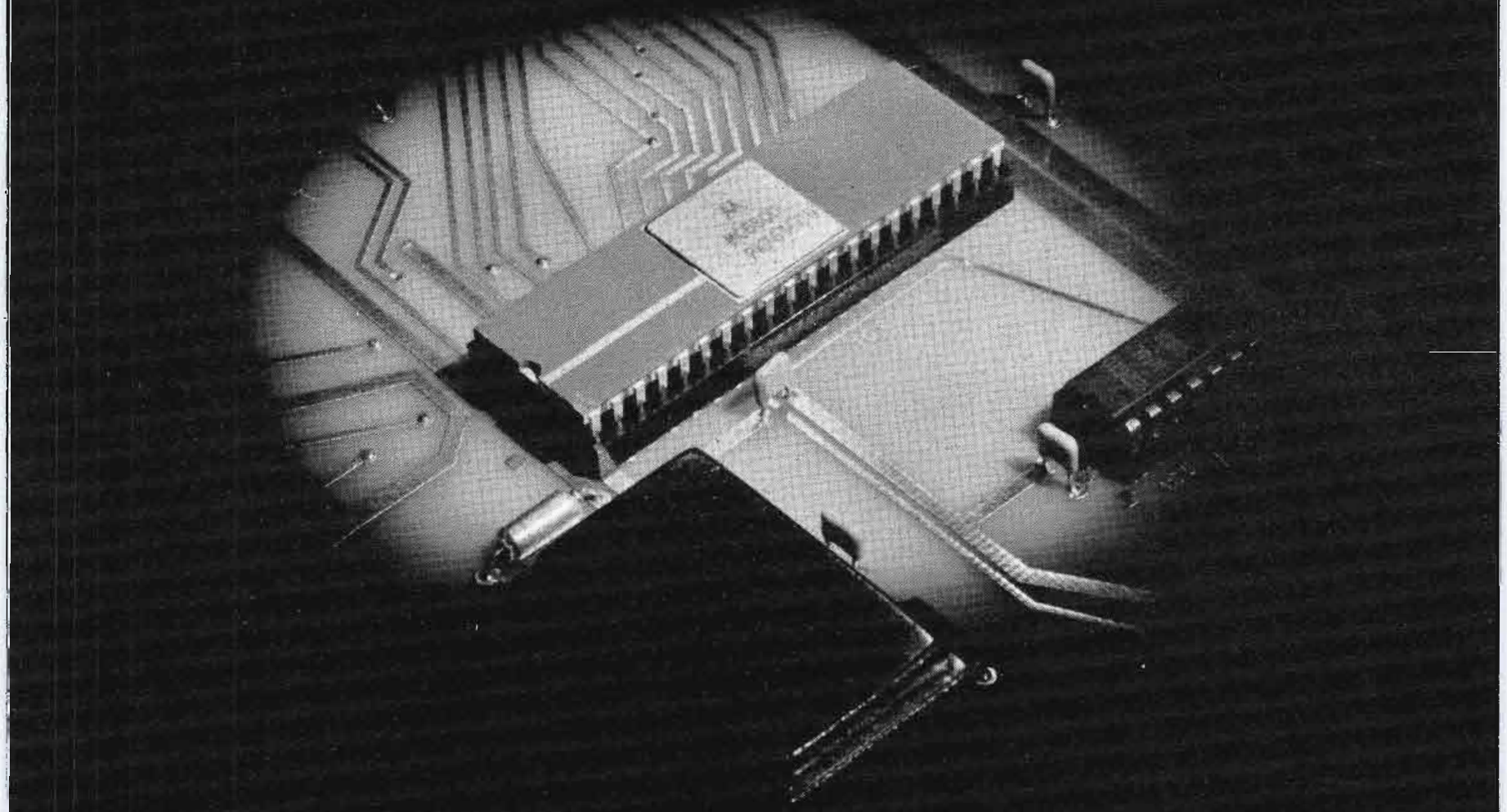

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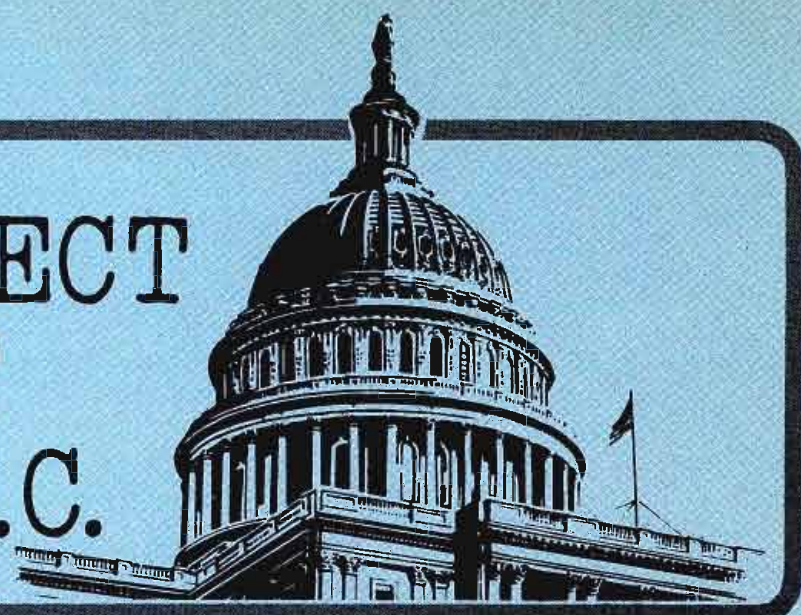

April, 1977/By Howard T. Head and Harold L. Kassens

Canadian Coordination of Remote Pickup Assignments

If you are located near the Canadian border and are having trouble getting remote pickup frequencies approved, it may be because of a long existing but little publicized agreement with Canada which requires across-the-border coordination on all assignments above 30 MHz (except FM and TV which are covered by separate agreements). As far as remote pickup is concerned, the pertinent area is from the border to a line described as follows:

> "Begins at Aberdeen, Wash. running by great circle arc to the intersection of 48°N., 120°W., thence along parallel 48°N., to the intersection of 95°W. thence by great circle arc through the southermost point of Duluth, Minn., thence by great circle arc to 45°N., 85°W., thence southward along meridian 85°W., to its intersection with parallel 41°N., thence along parallel 41°N., to its intersection with meridian 82°W., thence by great circle arc through the southern-most point of Bangor, Me., thence by great circle arc through the southernmost point of Searsport, Me., at which point it terminates."

Each assignment in this zone must be referred to the Canadian Department of Communications for approval. Unfortunately, there are no engineering standards for determining whether or not harmful interference will be caused, so it's a "judgement call". The only recourse we have is a provision which says that if both sides disagree, on-the-air tests observed by representatives of both governments may be run.

What appears to be complicating the situation at present is that the Canadians are using the frequencies for other purposes than we do. Recently, for example, their use of frequencies in the 160 MHz band for expanded maritime mobile purposes on the Great Lakes and Puget Sound has had a substantial impact on our use of this band for remote pickup.

Before you apply for frequencies in this zone, it might be well to check with the FCC about any possible conflicts. A further word of caution. In the new remote pickup rules adopted last summer, provision was made for a simple notification to the

Continued on page 6

CETEC Sparta's new SS1000A is really worth listening to.

For starters, our new AM transmitter produces less than 1% harmonic distortion. Near perfect. Advanced circuitry easily provides 125% modulation. So exclusive we've applied for patents. ☐ One factor we haven't provided is "dead air." Our SS1000A behaves much like a tube type — it simply ignores load variations. ☐ High overall efficiency? In spades. RF systems 90% or better. Remarkably low power consumption. ☐ Another plus. We use two accurate digital meters. Each assures an automatic "spare" for the other. ☐ *Extras:* no-load, no-tuning broadband combining system. "Tally light" fault locator system and individually replaceable PA and modulation Transistors. ☐ *Interesting fact:* CETEC Sparta is the only manufacturer of both AM and FM solid state transmitters. Enough said? Not quite. ☐ Wouldn't you as a *professional broadcaster,* prefer to talk to a *broadcast professional?* . . . about the good group of products from Sparta, Schafer and Jampro.
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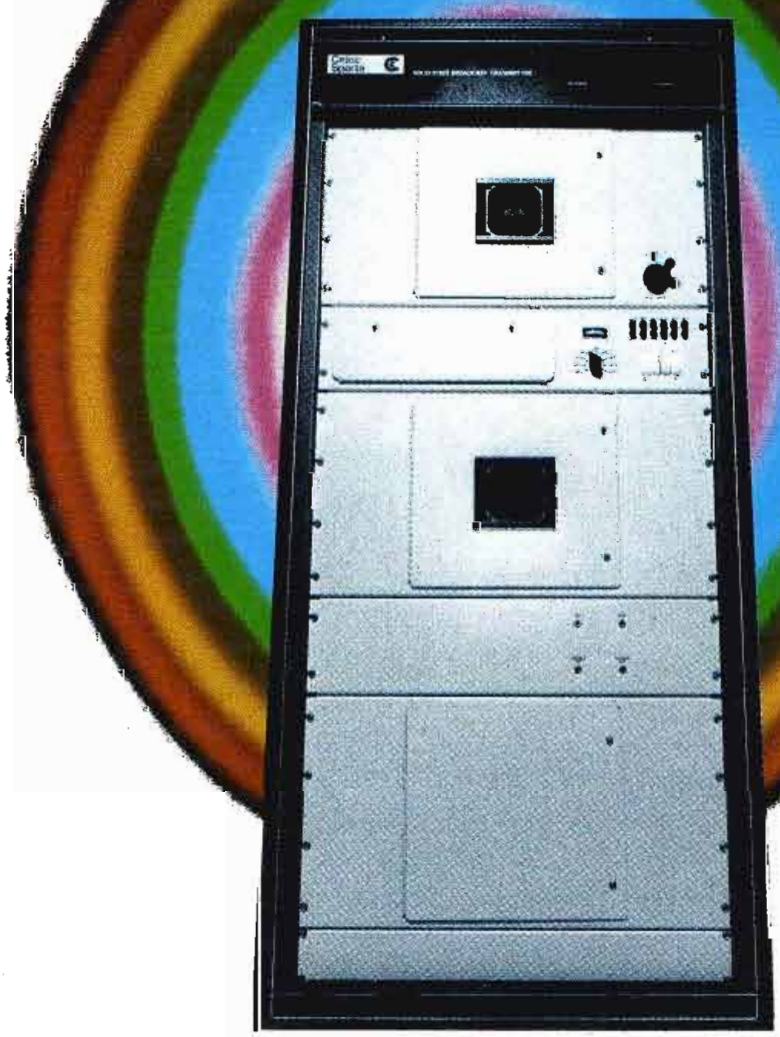

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DIRECT CURRENT FROM D. C.

Continued from page 4

Commission if you were required to change frequency because your use did not correspond to the new classification (e.g., program relay). This procedure does not apply to the zone south of border described above and the Commission is rushing out a corrective Order.

Antenna Monitor Deadline

Section 73.69 of the FCC rules requires that all AM stations using directional antennas must have a type approved antenna monitor by June 1, 1977. The staff has consulted the manufacturers of these units and has determined that they are available "off the shelf". Consequently, no extension of this June 1 deadline is contemplated. If you don't have one yet, you'd be well served to spring into action. When the new monitor is installed, an informal application must be filed with the FCC in Washington for license modification. It has been discovered that some stations are not doing so.

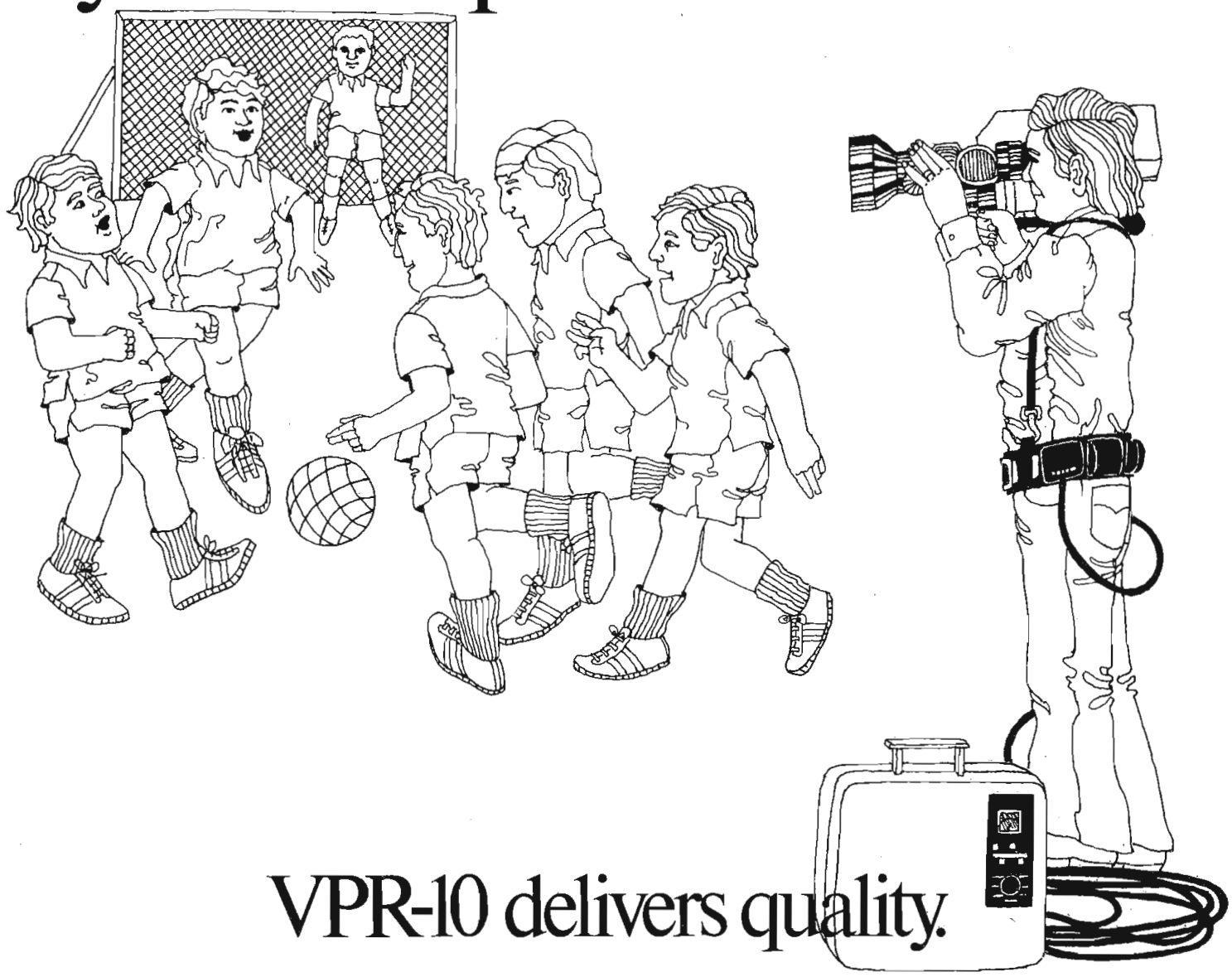
FM Interference to Hospital Equipment

A hospital in Omaha complained that it was experiencing intermittent interference in certain areas to coronary and general intensive care units, labor and delivery areas, and the EKG unit. It alleged the presence of electrical noise which sometimes causes EKG readings to be illegible; interference with the hospital safety groundcheck routine; the reception of radio signals in ultrasonic monitoring devices and EKG machines; inconsistent readings on the leakage current measuring device; and erroneous readings on current testers. All this because of an FM station with an ERP of 31 kW located across the street. The Commission considered the matter to be very serious and withheld action on a renewal application pending an investigation by its field staff. The result was that the interference complained of was due to a 60 Hertz leakage and was not attributable to the station although the high R.F. field did appear to have some side effect. Also it was determined that the hospital did not install filtering and shielding devices which were available. The Commission then granted the renewal, but held the door open for the hospital to make a stronger case if it wished to do so.

Short Circuits

The FCC has approved the use of wireless microphones on unused upper VHF-TV (7-13) channels by TV stations, motion picture companies, cable systems and other similar organizations...A TV station has filed a rule making petition to permit the use of a subcarrier on the aural carrier for the purpose of cuing and coordinating Electronic News Gathering (RM-2836)...NAB has filed a petition to amend the rules to permit rebroadcast of CB and Amateur transmissions consisting of emergency information, traffic, road or weather conditions, or information vital to public safety and convenience (RM-2830)...The 1977 World Administrative Radio Conference on Broadcast Satellites is over, but it didn't settle much. The allocation of slots in the equitorial orbit for satellites of countries in the Western Hemisphere is held off until 1982.

You want studio quality in your field-produced material.



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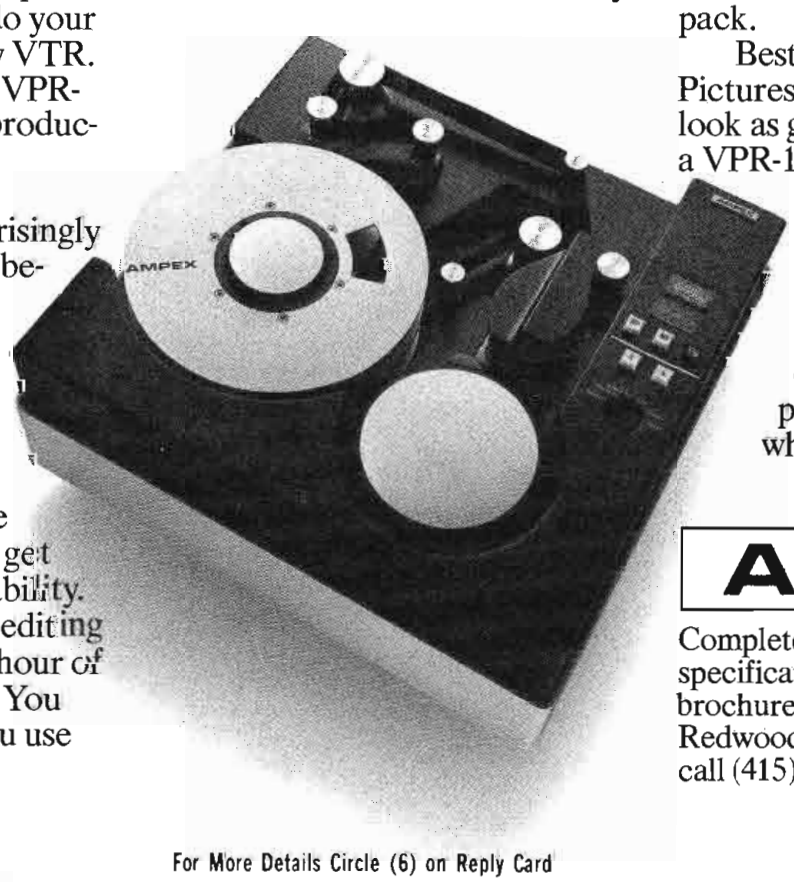
What do you get with the self-contained VPR-10? You get color video verification capability. You get automatic assemble editing as you record. You get a full hour of material on one reel of tape. You get power options that let you use the built-in batteries, or standard line current, or even the accessory socket in your vehicle. You even get a recharger for the VPR-10 battery pack.



Best of all, you get quality. Pictures from this portable VTR look as good as you'd get by moving a VPR-1 into the field.

VPR-10 from Ampex. The best studio-quality one-inch recorder ever offered in a portable package. For producers who can't take chances with picture quality, no matter where the action is.

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INDUSTRY NEWS

Spectrum Space Is Needed

The National Association of Broadcasters has told the Federal Communications Commission that adequate spectrum space is a must in order to maintain our free broadcasting, "the best system in the world."

FCC has asked for comments on the use of the International Table of Allocations as it relates to international and domestic needs for spectrum in preparation for the 1979 World Administrative Radio Conference (WARC-1979).

The WARC-1979 will determine how the entire spectrum used for communications will be divided until the year 2000. NAB, recognizing the importance of such a decision to broadcasters, filed extensive comments on spectrum needs of AM/FM radio and UHF television.

On AM radio, the Association warned against the dangers of reducing channel space to provide additional frequencies for other services. Tampering with channel space leads to interference, adverse effects on directional antennas, AM stereo and receiver design, NAB argued. "A reduction in channel spacing would impose severe technical and financial hardships upon broadcasters by necessitating the purchase of new equipment and conversion of existing equipment which would probably be too costly for marginal radio licensees to undertake," NAB said. Requests for additional AM facilities can be met by expanding the present AM broadcast band the Association suggested.

On Auxiliary Broadcast Service, which licenses remote pickup facilities, NAB argued that broadcasters need all the space they have. In fact, the Association said, there is a distinct scarcity of space for such services, and the entire 972-952 MHz band should be allocated to provide needed channels.

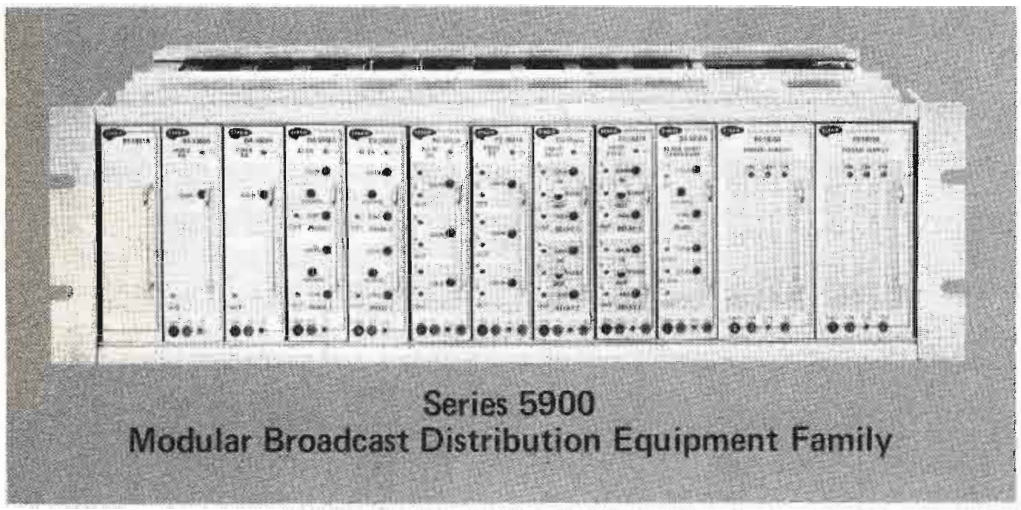
On FM radio, NAB agreed with FCC's proposal that spectrum allocation remain as it is.

Commenting on UHF television, NAB pointed to all the benefits provided to the public through both UHF and VHF television. Any plan, NAB warned, to decrease the number of UHF and VHF frequencies now allocated would mean a reduction in such services as news; public service announcements; critical emergency information during floods, fires, etc.; and valuable consumer information.

In addition, NAB pushed for restoration to UHF television part of the spectrum now shared with land mobile services. NAB also noted the importance of UHF translators for providing television service to sparsely settled, remote areas and said space for translators must be maintained.

Continued on page 10

A *NEW* addition to the FAMILY



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- **DA-5960A Video Distribution Amplifier** module provides six DC coupled outputs from one differential high-impedance looping input. Frequency response flat ±0.1 dB to 10 MHz, less than 0.1° differential phase and 0.2% differential gain.
- **DA-5966A Sub-Carrier Distribution Amplifier** module, provides regeneration and distribution of NTSC or PAL sub-carrier through six DC coupled outputs from one high-impedance looping input. Outputs are divided into two groups of three with independent phase and level front panel controls for each group. Phase is adjustable over a 0 to 360° range.
- **PD-5941A Regenerative Pulse Distribution Amplifier** module provides six DC coupled outputs from one high-impedance looping input. Outputs divided into three groups of two outputs with independent level controls for each group.
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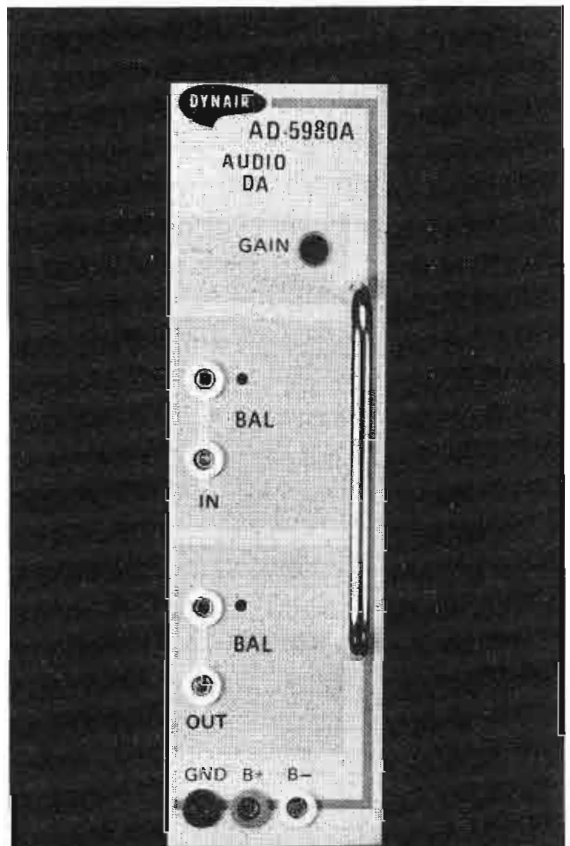
Model AD-5980A Audio Distribution Amplifier



The AD-5980A Audio Distribution Amplifier adds audio distribution to the Series 5900 family. Six outputs are derived from one high-impedance bridging input with 60-dB common mode rejection. Features include +24-dBm output for plenty of headroom, flat response to 20 kHz, -80 dB s/n, +22-dB gain, and 0.15% maximum distortion.

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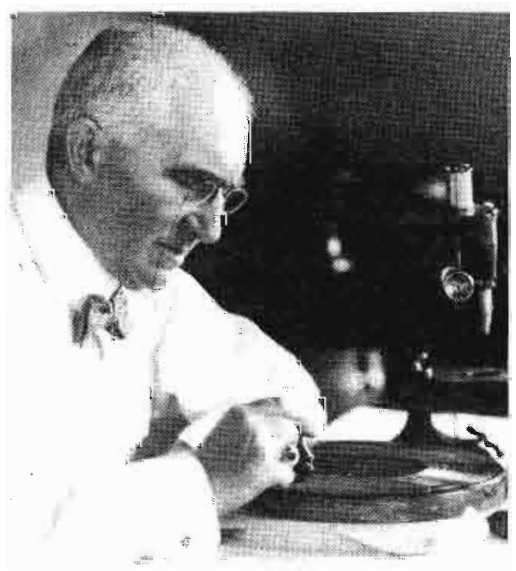
Continued from page 8

NAB pointed out that satellite-to-home broadcasting would eliminate the local outlets for news and information. The Association commented: "A comparable service at the national level could never obtain an equivalent grasp of local needs and interests, nor program to meet those needs and interests, nor would local governmental bodies have a means of communicating with the people. In addition, such a system would be inefficient and too expensive for local and regional advertisers, thereby impacting adversely on the local business community and its employees."

Nor does the NAB consider the wired city concept a viable alternative. "It would unfairly discriminate against those least able to pay for such services as pay cable television. A wired nation would cost 200 billion dollars in capital investment and about 64 billion annually to operate. No capital entrepreneurs have shown much interest in wiring inner city ghettos where collection problems among the unemployed would be a severe problem, nor in wiring rural areas where the density of subscribers per mile would probably never recoup the capital investment," the Association concluded.

100th Anniversary For Microphones

April marks the 100th anniversary of the invention of the microphone by Emile Berliner, at age 25 and a penniless immigrant youth from Germany, who went on to give the world another of its greatest benefits in the form of the disc record and player, the method of mass-producing discs from a single master, and the famous "His Master's Voice" trademark.



Emile Berliner's microphone made practical telephony possible, and its acquisition by the then-fledgling Bell System saved the firm from destruction by the then-powerful Western Union and paved the way for Bell becoming the world's largest corporation. The loose-contact principle introduced by Emile Berliner and still in use throughout the communications world today, was deemed to have passed the limits of scientific credibility at the time.

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The BVH-1000 produced picture quality difficult to believe. In fact, broadcasters didn't believe it. They had to see it for themselves. And they snapped up every prototype we could deliver.

Since then, we've made some changes. Added more features. Expanded the BVH concept to include a portable model, the BVH-500, for professional 1″ production in the field.

And we've sold a lot of machines.

If you're considering the move to 1″, consider the advantages of the BVH-1000.

1. The Advantage of Shared Sector Scanning. The Sony Broadcast BVH-1000 and BVH-500 both use an exclusive system of scanning that records video and sync (lines 1-17) with separate heads. Which means the entire vertical interval is captured and available for encoding any signal required in the future by the FCC.

Color banding is eliminated. And generation after generation, the BVH-1000 picture retains incredible clarity and precision.

2. The Advantage of BIDIREX. Film editing techniques, with a professional video recorder?

That's what you get with the BVH-1000. Not one, but two control modes are provided to give editors a true "film" feeling. In shuttle mode, the tape can be moved in either direction, from stop to 30 times normal speed. With a recognizable picture, so you can make fast editing decisions.

In jog mode, the BVH-1000 lets you move the tape as though you were positioning the reels by hand—while you monitor a fully locked picture.

3. The Advantage of Interchangeability. 1 dB down is the specification. Need we say more?

Sony's interchange is guaranteed by a gimmick-free devotion to precision mechanics and supported by the experience of building several hundred thousand video recorders.

4. The Advantage of Color Framing. Some high end production recorders don't offer color framing. Others make it available as an expensive option.

But both the BVH-1000 and BVH-500 provide color framing capability as standard equipment. Add that to a logic system ideally suited for computer assisted editing, and the Sony BVH-1000 is your best bet to produce that "word from our sponsor."

5. The Advantage of High Fidelity Audio. Not one, not two, but three isolated audio tracks with frequency response from 50 Hz to 15 kHz. With over 50 dB isolation between tracks.

Never before has any production recorder offered the level of audio quality found in these two new Sony Broadcast machines.

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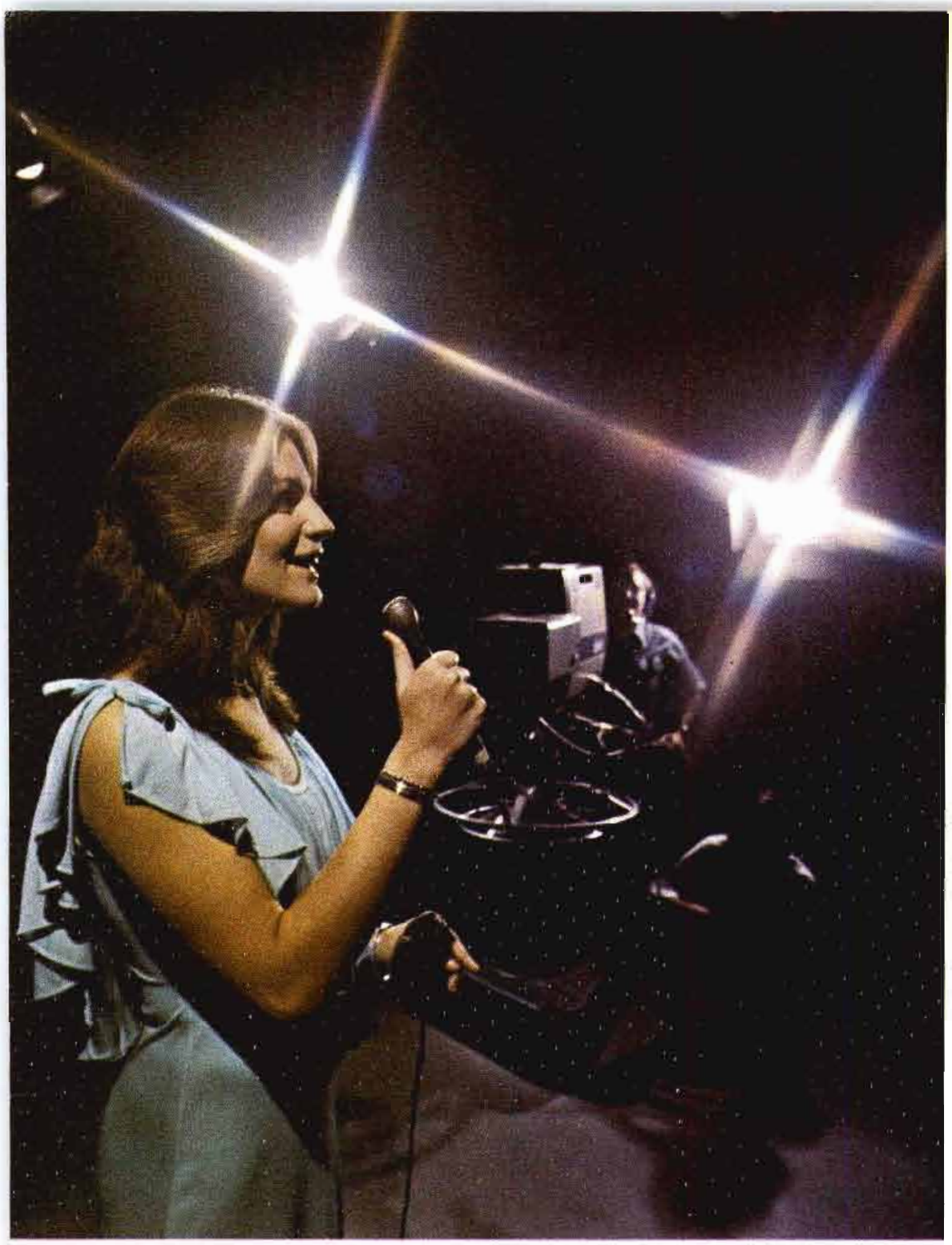

Figure 1. With more and more broadcast programming being produced on video tape, there is a growing need in the industry to understand specialized lighting techniques—both to create dramatic effects and to solve video problems.

Notes on advanced techniques

BEYOND FORMULA LIGHTING

By Ron Whittaker

The standard "formula" approach to television lighting has served the industry rather well over the years. Those who have taken the time to learn it know that it can be relied upon for 90 percent of the day-to-day production requirements. Traditionally, commercial television has had a limited need and opportunity to go beyond the formula approach. And when you consider the regular limitations in studio time, resources, etc., this in not surprising.

But recently some things have been evolving which suggest that producers and lighting directors need to go beyond these simple formula approaches to meet the challenges being presented by some important changes in the industry.

First of all, we are seeing more and more programs and commercials produced on video tape. Formerly, the "important stuff" was generally produced on film, usually by specialists who knew something about the technical limitations in the video medium. Although the battle over film vs. video tape will undoubtedly rage for some time to come, we can't deny that more and more television content is being produced on video tape.

But many of these video tape productions lack the artistic production quality associated with film, particularly in the area of lighting. There are a number of reasons for this. For one thing, many programs now are "recorded on tape before a live audience," and the lighting has to be fairly flat to insure that a number of camera angles are adequately lit at the same time. With film, scenes are typically shot "take" by "take," with each scene being carefully composed, miked, rehearsed and **lit.**

Another reason is that the art of creative and dramatic lighting has been much more a part of the history of film than video. Very early it was learned that video would not handle anything like the brightness ratios that were possible with film. Engineers, with an eye on technical excellence, saw that relatively flat, even lighting looked best on a waveform monitor. This judgment was often borne out by

the technically disastrous results produced by "production types," who would try to emulate "Hollywood lighting," without an understanding of such things as waveform patterns, brightness ratios, consistent reference whites and blacks, etc. "Hollywood lighting" (whatever that is) may look strikingly dramatic when projected on a theater screen but very poor on a home receiver.

There are a number of other factors which put a greater emphasis on high quality lighting.

Television technical quality is highest with totally electronic photography. resolution, tonal scale and color fidelity of studio cameras have all made major gains in the last few years. Even the weakest link in the quality formula, the home receiver, has made gains—both through improvements in receiver design and in the distribution system (principally CATV). In short, home viewers can now potentially "see" more than ever before. These are just some of the reasons behind the need for production personnel to have a greater working knowledge of video lighting.

This article will **not** deal with the basic "formula" approach to lighting—even though it can be relied upon for most of your day-to-day productions. However, if you would like to review this basic formula approach and some notes on the whole subject of television lighting, you might look up the March/April and May/June, 1976 editions of **Video Systems,** which featured a two-part article on the subject.

"Non-Standard" Lighting

Beyond the basic formula approaches to lighting there is frequently a demand to design lighting to meet special needs—needs represented by (1) problem subject matter such as glassware, bad complexions, etc., (2) special dramatic

Continued...

Figure 3. This photo illustrates the effect of the lighting tent (shown in Figure 4) on the same subject matter as in photo 2. Note that the result is much "duller," but that the subject matter has been brought within the brightness capability of the broadcast system. Although the effect may look a little drab here, the video quality would be greatly improved.

Figure 2. This photo illustrates a collection of objects which have high spectral reflections. Although these reflections might look attractive when reproduced in a color printing process they cause severe problems in television video.

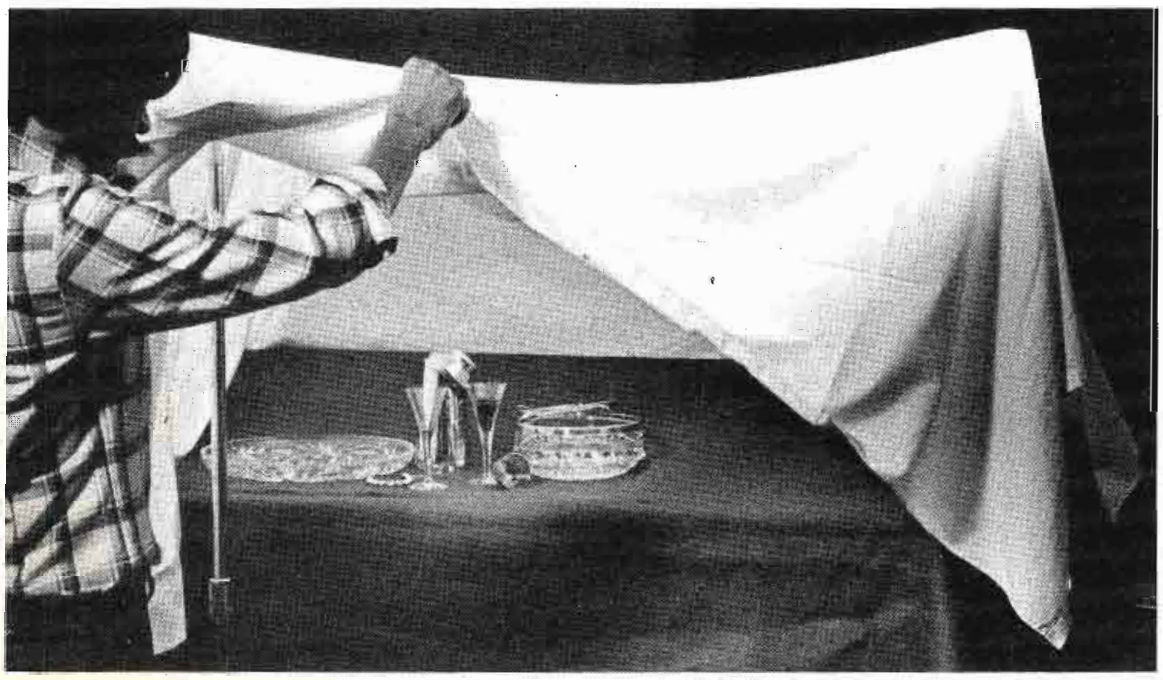

Figure 4. The bed sheet light tent used to make Figure 3. Several studio lights are directed at the tent from a number of angles. The type of lights doesn't matter, since they will end up being greatly diffused. For maximum effect completely surround the subject matter with the sheet, leaving only a small opening for the camera lens.

Figure 5. Illustrates the significance of lighting in hiding details. This photo was taken with rather diffused (flat) lighting. The shadow from the flowers indicates that the lighting is far from completely flat, however. If it were, you would see even less surface detail.

Figure 6. In this photo an undiffused key light was used at about 85 degrees to the right of the camera to bring out surface detail. Again, note the shadows from the flowers.

Lighting

(Continued)

interpretations, and (3) a need to, in general, maximize the attractiveness of people and products by emphasizing the positive attributes and playing down or hiding negative attributes.

Shiny Objects

Let's start with one of the biggest headaches of all—objects producing spectral reflections.

Spectral reflections from shiny objects are a problem from a number of standpoints: they put spikes in the video which have to be clipped, they cause bad streaking or comet-tailing in video when movement is involved, they cause problems for chroma key, and, in general they degrade both the quality of the video and the appearance of the item being photographed.

Figure 2 shows some particularly difficult subject matter under standard, formula lighting. Figure 3 shows the same objects lit by the "tent" arrangement shown in Figure 4. You will note that the spectral reflections have been eliminated.

The problem with spectral reflections, of course, is that your light sources are reflected directly into the camera lens. And, if that isn't bad enough, these lights tend to be concentrated, since most of the objects have convex surfaces.

From Figure 4 you can see that a bed sheet tent diffuses the light, so that, in effect, it becomes omnidirectional. In short, no hot spots. And as an important added bonus, you don't get a wide-angle reflection of your camera and surrounding studio.

A white, frosted, shower curtain will work equally well as a diffusing medium. In either case, don't get your lights too close; not only will hot spots start to become visible, but you might just set the whole thing on fire!

Another way of controlling spectral reflections is with dulling spray. Be certain before you use dulling spray, however, that it will not damage the surface of the objects you are working with. The owners of some valuable items have refused to allow the surface to be sprayed because they feared it would be difficult to get off, or would permanently affect the surface.

An important thing to note is using the lighting tent is that the back of the tent should not be picked up by your camera, since it would probably cause the video to exceed the 20:1 brightness ratio. This would cause tonal compression

Continued...

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SOMETIMES, THE NEWS CAN HAVE TOO MUCH IMPACT.

For More Details Circle (13) on Reply Card

Figure 7. A low key lighting effect does not mean "low intensity." To achieve this effect the key light is moved to an extreme angle and key-to-fill ratio is greatly increased.

which would darken the appearance of the object.

You can avoid this and still get some back light through the back side of the tent by using a curved piece of colored matt-surface cardboard or paper under the object(s), which curves up to form part of a background.

You may find that you want to introduce some natural reflections on the surface of the object. This can be done by hanging strips of black crepe paper inside in front of the tent. Just experiment until you get an effect that looks attractive and realistic.

Other Uses For Flat Lighting

Actually, tent lighting is only flat lighting taken to the extreme. There are some situations where a less drastic form of flat lighting can be used to advantage.

Acne-scarred complexions often look bad on camera—especially in close-ups. Formula lighting is designed to bring out a certain amount of form and texture in faces, and this is very desirable if the skin is relatively smooth. If it is not, start with expertly applied make-up, and then back that up with flat lighting.

A typical lighting set-up would be two scoops covered with scrims (spun-glass-like material) at a 1:1 key-to-fill intensity ratio. Place one scoop about 30 degrees to the left of your close-up camera and the other about 30 degrees to the right. Both should be just above the height of the lens. Broads or Fresnels could be used with good scrims, if scoops are not available.

Since the subject will look rather flat with this technique, make sure that you have both good backlighting and good background lighting. This will insure as much depth and separation as possible.

Interestingly enough, another application of this flat lighting technique is with women who are anything but flat. Cleavage, which is too much or too obvious, is still a "no-no" with much of the broadcasting audience. Occasionally, however, a guest will show up for a program with a dress that is too revealing for the family hour.

Before creating an embarrassing situation, try a flat lighting approach. In this case you can leave the scoops in a higher position—pointed down at about a 45 degree angle from the lighting grid.

Generally, you encounter these "crises" on relatively short notice, of course, and about the best you have time for is to change the normal 2:1 key-to-fill ratio to 1:1 and hope for the best; or, in this case, the least.

Emphasizing Surface Detail

On the other side of the coin, you sometimes need to emphasize surface detail. Figures 5 and 6 represent such a case. With flat lighting, or even with formula lighting, there is insufficient detail on the surface of the subject matter. By placing one non-diffused point source of light at an oblique angle to the surface of the object, strong, minute shadows are created which emphasize the necessary detail. In this case you would probably want very little, if any, fill light; only a key light, a back light and possibly a background light. For a key light you might try a beam-spot projector or an ellipsodial spot (without a Fresnel lens).

Food Commercials

One of the most difficult subjects to photograph effectively is food. It is amazing how a seemingly very attractive food dish can look very unappetizing when it shows up on a TV screen.

It's been the writer's experience that many food dishes have to be quite carefully lit—generally individually lit—to make them appear attractive.

First of all, since your camera will be operating at close distances, there is typically a problem with depth of field. The only way you can get more depth is to stop down your lens, and the only way you can stop down your lens and still stay away from video noise is to increase the light level.

If you are selling ice cream or Jello, this can be a problem. I have resorted to using lard for ice cream (back when there were no FTC problems) and had a refrigerator load of Jello dishes standing by for different video "takes."

For food dishes you need to experiment with light placement, using a color monitor, to see what will bring out the best effect. Often rather strong backlighting, sometimes from two angles (cross backlights) will provide added depth and "sparkle."

It is recommended that you put the dishes or settings on separate tables and have all your lights on adjustable roller stands. By slowly moving the lights while observing the effect in a monitor, you can discover the best effect. After some practice, your "search time" will be greatly reduced on subsequent productions.

Continued...

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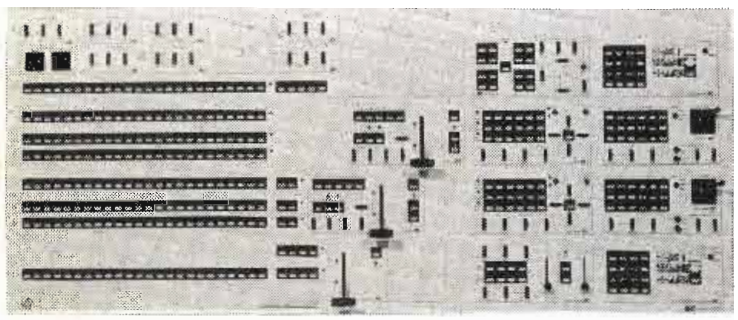
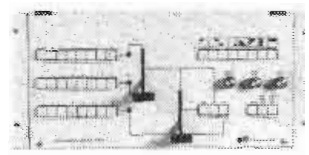
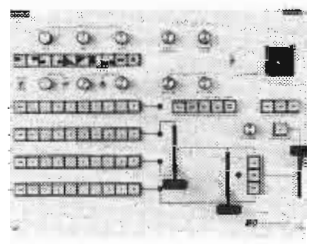
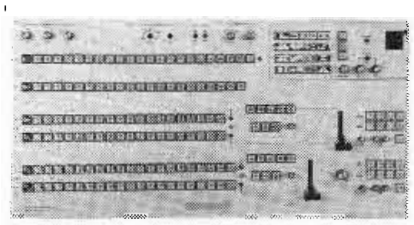
Video switchers.



New, Super Powerful CD 480 The Smart Switcher
Revolutionary modular switchers with unprecedented production power. They outperform the largest conventional switchers, yet are extremely simple to operate. Their power and ease of operation are due to CDL's new Sequential Effects (SFX) Amplifier, which can cut, mix or wipe between two Background Sources and two separate Key Sources either individually or in any combination. Models with one or two SFX Amplifiers provide all the standard and optional features you need, including Rotary & Random wipes, RGB Shadow keys, Hard and Soft Color Border wipes, Color Border keys, Quad with Color Borders, Encoded Chroma keying, Key Mask generator, and 16, 24 or 32 inputs. A variety of modular accessories will continue to keep your switcher smarter than the rest as new technology develops.







VS-10
An inexpensive broadcast quality 8-input switcher that features flexibility and ease of operation. Self-contained electronics for rapid installation in ENG and other small mobiles.

VS-14
Sophisticated enough for large studio production, yet compact and inexpensive enough for small mobiles. Soft wipes and keys—even a Downstream keyer—are standard. Self-contained and remote versions available.

VSP-1260S
An amazing value
Now the smallest station can afford a conventional 20-input mix/effects switcher of the highest quality and reliability and get it in under 30 days! All features, including an Encoded Chroma keyer and Bordered keys, are standard (not optional, as is often the case). And the price is astonishingly affordable.

Ask about the AFM-10 Audio Mixer/Switcher—an ideal companion to the CDL VS-10 and VS-14 video production switchers.

Automation.

System 100
Computer controlled automation system for Technical Operations that communicates directly with a Business Computer System. Stores and retrieves the schedule with entry error checking, makes automatic time corrections, performs complicated audio/video switching sequences (including dissolves, fades, wipes and keys), assigns machines, verifies material, and prints the "As-Aired" log.

Master Control Switchers
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Tape editing systems.

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EDS-200
Video Tape Editor
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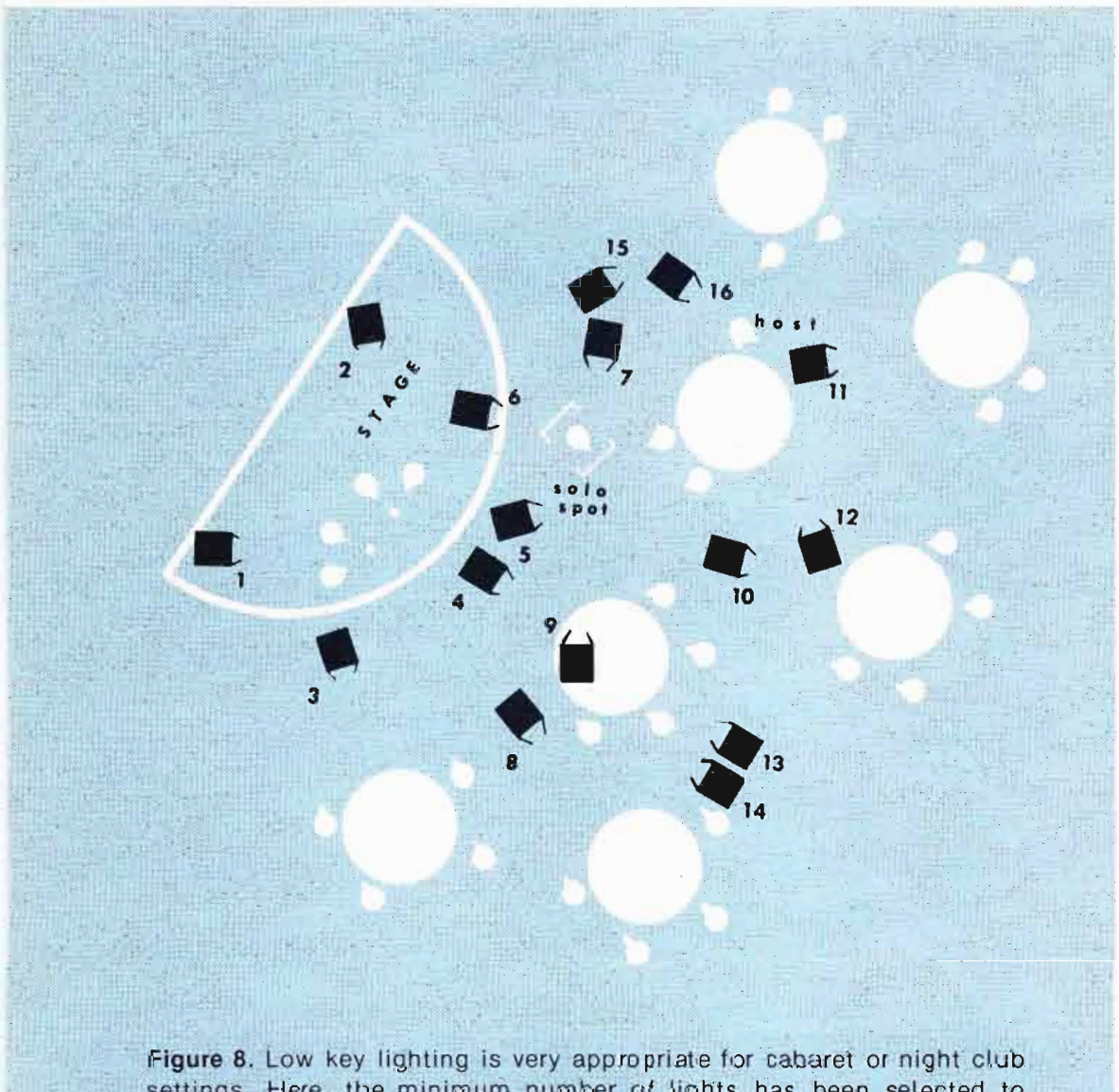

Figure 8. Low key lighting is very appropriate for cabaret or night club settings. Here, the minimum number of lights has been selected to give adequate frontal illumination to the stage, solo spot and host positions for several camera angles. The single Fresnels aimed at each of the seven tables gives a rim light effect on the faces in the audience for most camera angles. These single lights also maintain an illusion that the tables are lit by stage illumination (or possibly by the candle on each table).

Each of the 16 Fresnels is barned off as much as possible to reduce ambient, spill light, which would weaken the low key effect. With ambient light at a minimum in the background areas, your cameras can roam a full 360 degrees around the setting without being seen. Experience using this setting has shown that these areas can be kept dark enough to hide one camera when another is shooting directly at it from the other side of the set. (The only thing that might give you away is the tally light on the opposing camera on the lap dissolves; and, if you want, you can even shut that off.)

The double back lights on the stage become kicker lights on the performers for some camera angles. Back light #1 is slightly closer than #2, because the performers in the first two stage positions have Afros. The two large key lights on the stage (#13 and #14) are low in height and at a relatively great distance to maximize a star filter effect on reverse angle shots from behind the stage.

The lights for the solo spot and host position are faded up when needed. Five lights cover these positions. Lights #9, #6 and #7 are used for the solo spot. (Two back lights provide separation for a number of angles.) Only two lights are used for the host spot: #12 and #16.

Fresnels #3, 4, 8, 5, 10, and 11 are for the seven tables. See the text for more details.

If food is supposed to be served hot, it is best if it is obviously **steaming** hot. A microwave oven standing by is a good solution for this. Good backlighting should make the steam visible against medium to dark backgrounds.

Watch out for the effect of "simultaneous contrast" with certain foods. This is when a background or adjacent color affects the color of the central subject matter. Generally, the color shift is to the compliment of the influencing color. Tuna fish, for example, can look down right bad, if it is placed next to the wrong color. You will also have to carefully watch brightness ratios with foods in general, to make sure video isn't shifted away from normal hue and brightness values.

Dramatic Effects

Dramatic lighting interpretations are probably the most challenging in the art of lighting. These productions can take on an entirely different atmosphere when interpreted by different lighting directors. Part of the challenge here is that with video productions you generally don't have the luxury to stop down after each scene, or reset lighting. The word "generally" implies two qualifications.

First, it is possible to sometimes unobtrusively change studio lights during a production, especially if you have a programmable lighting board which can automatically alter large numbers of lights at the same time. Second, there are situations where video tape is shot like film; that is, one "take" at a time. Because of the many advantages to the latter approach, we will probably see more of it in television in the future.

Low key lighting is the most popular category of dramatic lighting. Contrary to popular belief, low key does not mean low intensity. With low key lighting, the key lights are just as bright as with the formula approach. If they weren't, the engineers would just have to open camera irises until the reference white reached 100 percent.

Low key implies a high key-to-fill

Continued...

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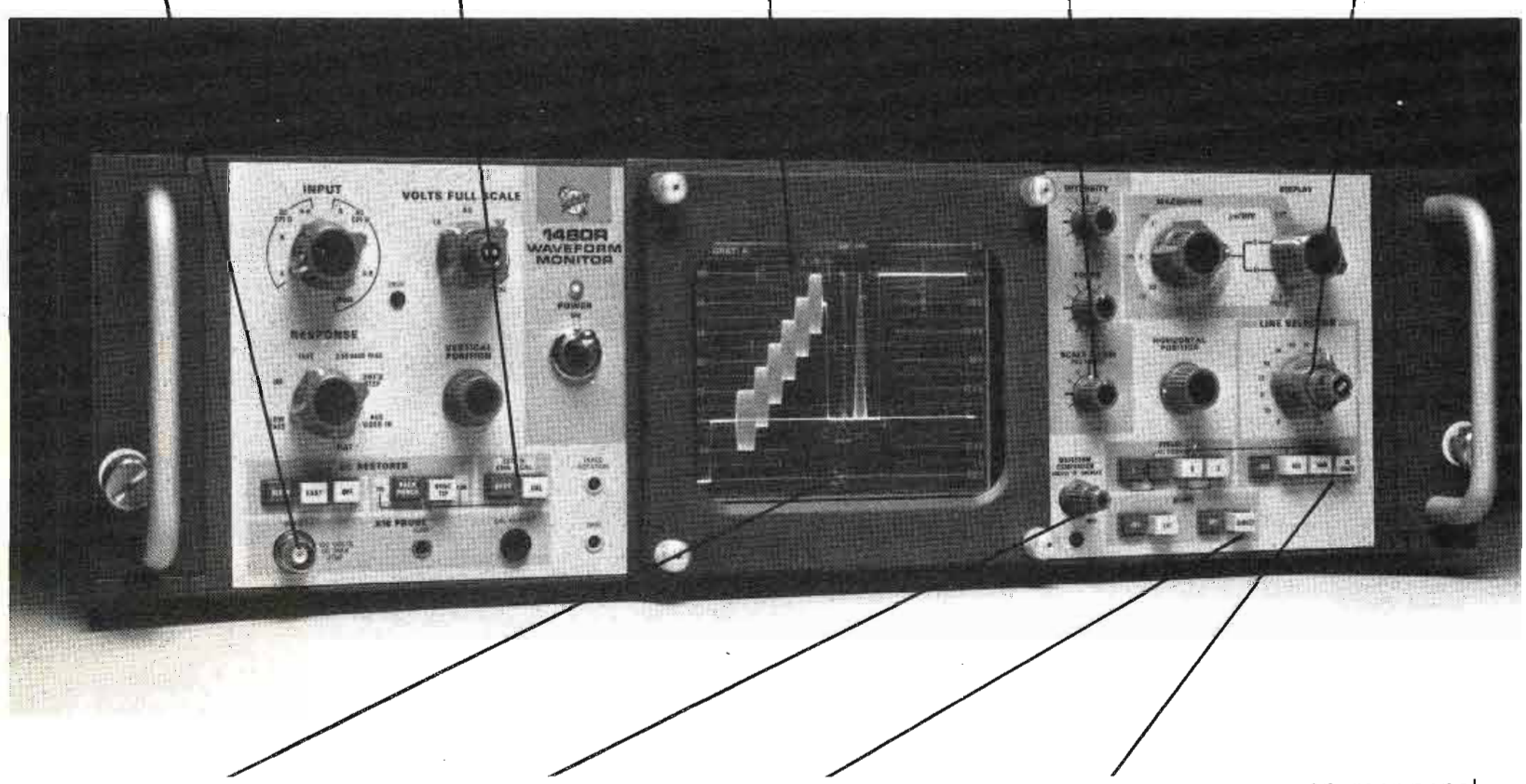
Digital line and field selection For positive identification of signals displayed.



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15 Line display This 1480 feature permits head-by-head VTR signal examination.

on rear panel

Auxiliary video input A special input/output circuit allows you to measure chroma/luminance gain and delay without disturbing your signal and for the use of special filters for unique measurements.

Line strobe In addition to having an auxiliary strobed video out for identification of individual lines on picture monitors the 1480 will strobe individual line vectorscope displays.

The TEKTRONIX 1480R Waveform Monitor does look like the TEKTRONIX R529; just as the half-rack width 1480C looks like the 529. But, there are differences. Some of them subtle, like the sharply focused trace on the bright CRT, others more conspicuous, like the optional input for use of a high-impedance probe. Some features won't be noticed until you examine the rear panel, like the line strobe output for strobing a vectorscope. This is a technique for intensifying individual line displays.

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Figure 9. Rim lighting will provide a dramatic effect, but camera angles must be carefully controlled. One or two backlights should be used, depending upon subject matter.

Figure 10. It is sometimes desirable in news and documentary work to hide the identity of a subject. This situation is a little more complex than straight rim lighting because the interviewer must be well illuminated.

Lighting
(Continued)

ratio. This results in greater shadow areas—the ones the fill lights would normally fill in. By moving the key lights to an even greater horizontal angle—say to 70 or 90 degrees, instead of the normal 45—the low key effect will be further enhanced. (Figure 7)

Depending upon the intensity of the fill light—if you want any at all—you will lose shadow detail. But part of the object of low-key lighting is to create large dark areas in the video.

Be advised that low key lighting does not show up "attractively" on a waveform monitor or on a black and white receiver without DC restoration. Dramatic license will have to cover that.

The increased angles of the key lights will generally create unusually bright highlights in the subject matter, so you will have to guard against clipping the video spikes.

Figure 8, with its lengthy explanation, illustrates a lighting ploy for a low-key production. The close-ups on the stage performers, solo spot and host will not be low key, but the wider shots of the whole setting, and especially the audience reaction shots from most angles, will definitely be low key. For a production such as this you would want a dark-colored or black background and a dark floor covering. Even light colored table cloths will introduce undesirable ambient light. A good choice to keep the scene "warm" would be dark red.

Figure 9 illustrates the effect of rim lighting. Notice that the subject matter is almost totally in shadow; low key lighting to the extreme. Besides the dramatic effect you see in Figure 9, rim lighting can be used to hide the identity of an individual. (Figure 10) You have probably seen this approach used in news and documentary work.

Basically, all you have in rim lighting is the effect of one or two back lights; nothing else. Two back lights will give you a little more of a "rim," which might be necessary with some hair styles. Be sure to keep the ambient light level down, or the face will start to become visible. A white shirt or dress worn by an interviewer, or even a light floor, will start to illuminate a dark face.

When the rim lit person is taking part in a one-on-one interview, the biggest problem is to keep the back light from the interviewer off the interviewee. If careful barning of the back light doesn't do it, you may have to forego the backlight on the interviewer completely.

In Summary

There are many other non-standard lighting situations which could be touched upon. You might look to future issues of **Broadcast Engineering** for more on the subject.

In the space allotted, however, we have tried to illustrate and explain some of the more common problem areas.

Again, we might say that the future of broadcasting will undoubtedly put much more stress on creative and effective lighting. Already we are seeing this need as video starts to assume some of the role previously held by film.

You might also keep in mind that in the final analysis all video ultimately comes back to **light,** and how it interacts with subject matter, and what we do to both shape and follow up on that interaction. □

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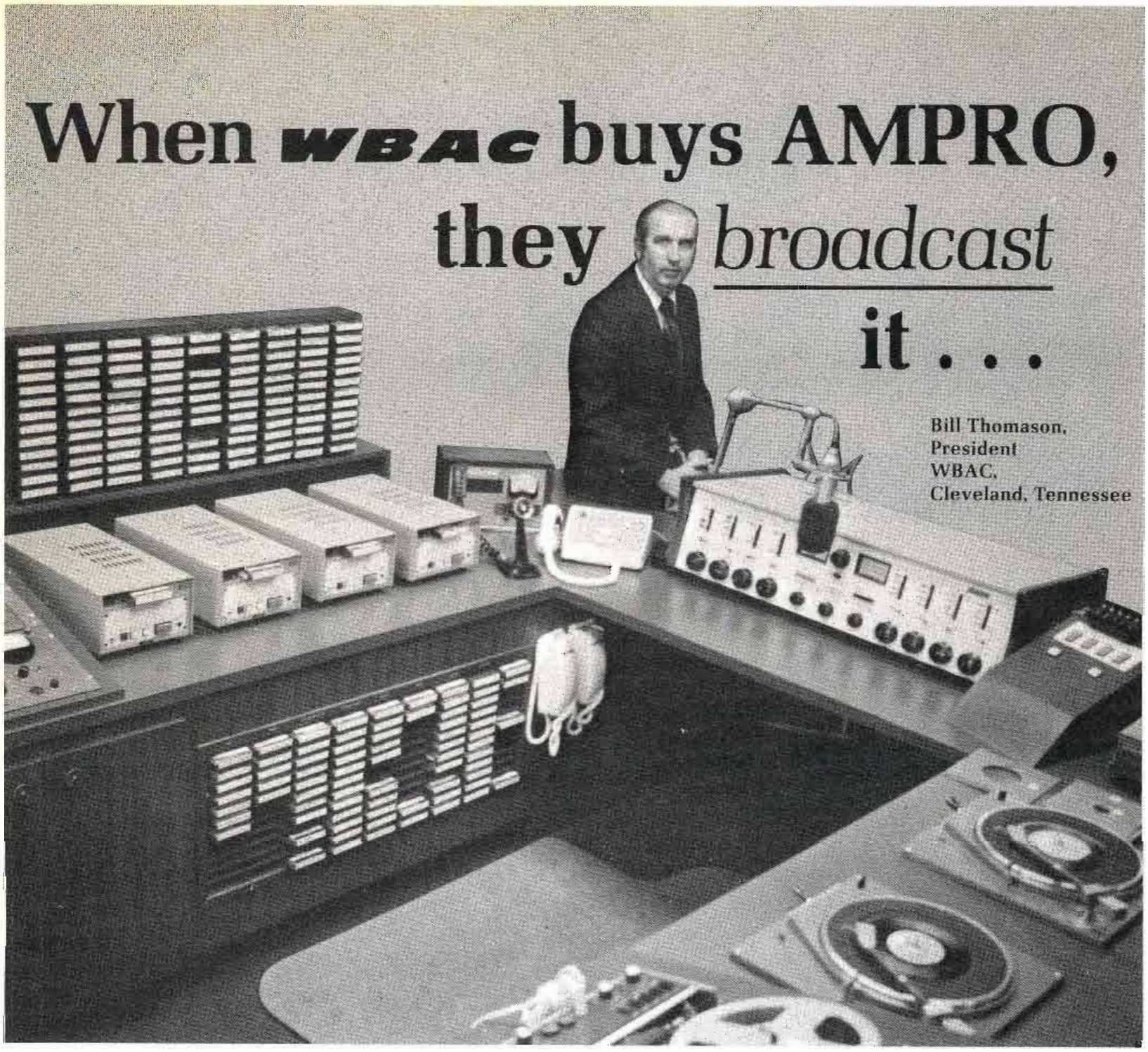

Bill Thomason,
President
WBAC,
Cleveland, Tennessee

and, according to Bill Thomason, President of WBAC . . . "our reason for choosing an Ampro console was its versatility and the unique craftsmanship that went into the makeup of this fine piece of equipment. WBAC has been in the broadcasting business for 32 years and our format and needs have grown. We were impressed by the many functions of our eight channel dual mono Ampro. For this reason, we decided to try Ampro's cartridge decks and, to our satisfaction, we have not had to do any type of maintenance other than routine head cleaning for over a year."

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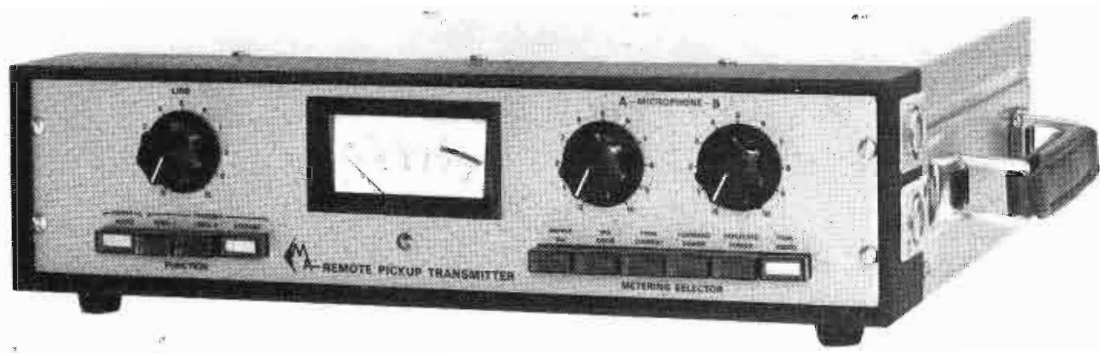
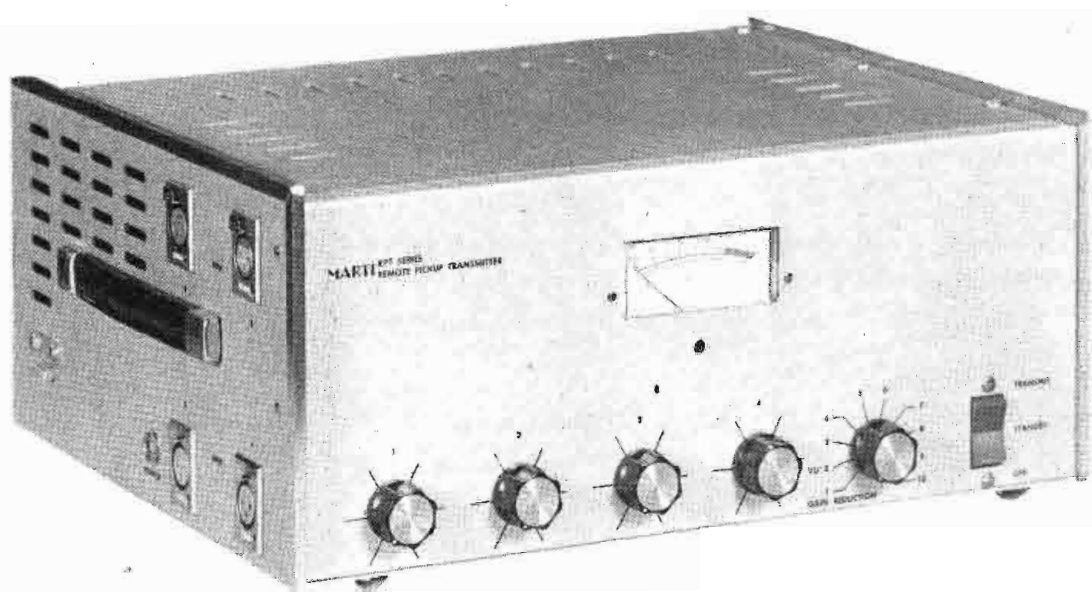
RENG: RPU Roundup

*By Peter Burk and Peggy Brown**





Here are two examples of available RPU transmitters. Above is the Moseley unit. Below is the Marti transmitter. (No picture was available at press time from McMartin.)

*Peggy is the Editorial Assistant for **Broadcast Engineering.** Before coming to BE, she graduated from the University of Kansas William Allen White School of Journalism where she received a BS in news-editorial with a magazine emphasis. She has worked on publications for the Architects Community Team, a VISTA organization; and KU publications.

■Hopefully during the last few months we have stimulated some serious thinking about RENG. This month we will show you what is available and what equipment *you* need to get on the electronic bandwagon.

Purchasing RENG equipment should be approached thoughtfully. You'll be using the equipment for a good many years, so make the right choice the first time around. *Plan ahead.* Frequency allocations are already severely limited, especially in the VHF bands, and they aren't going to get any better. If you can anticipate your needs for the coming years, you'll save some grief later on.

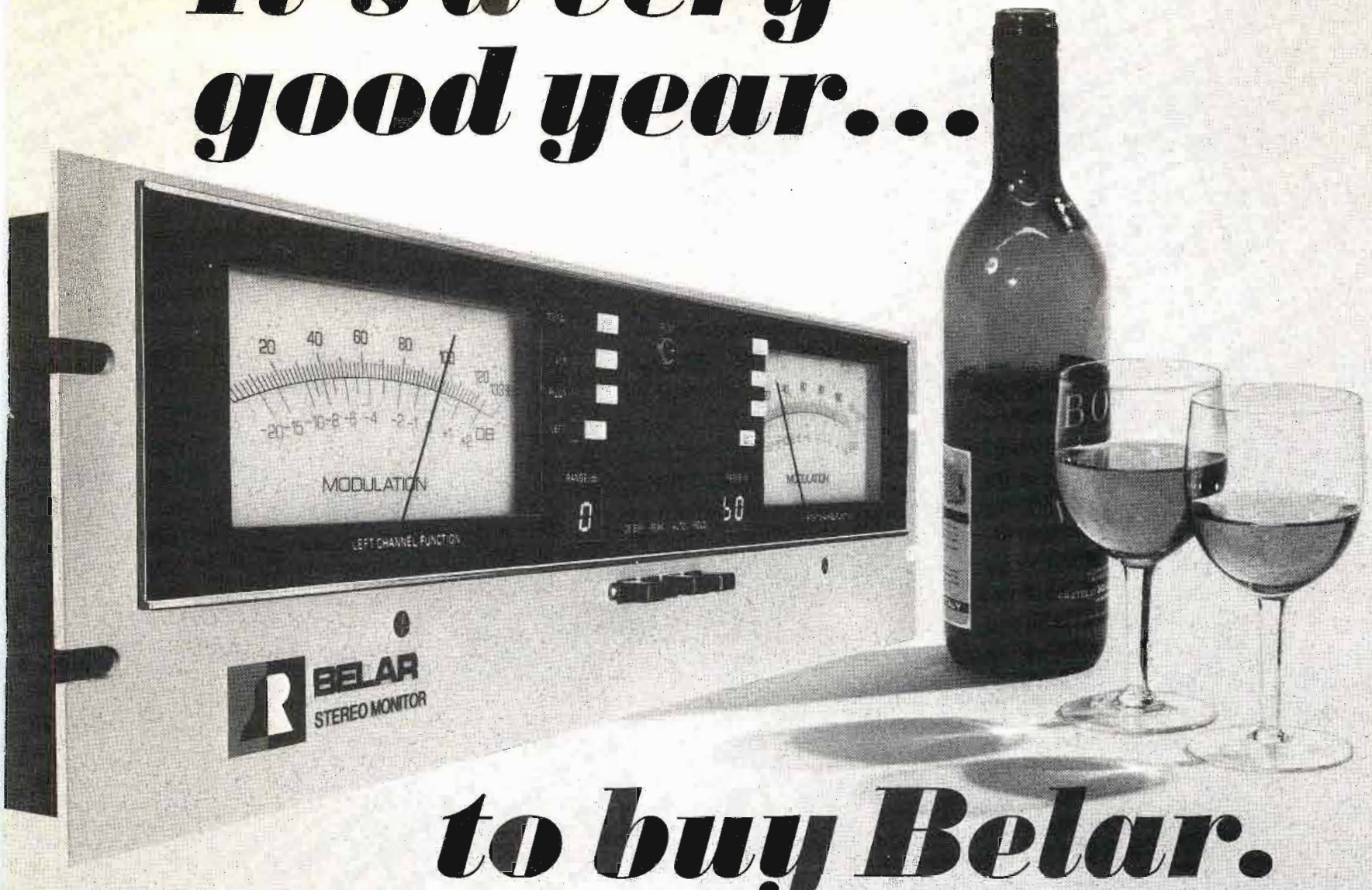
The heart of your RENG system is the VHF or UHF remote pickup link. That's the area that we'll devote the most attention to here. There is a pretty good selection of transmitter and receivers that meet broadcast specs. For that reason, we'll confine our discussion to broadcast quality equipment. If you are convinced that adequate quality is attainable with conventional communications type two-way equipment, we suggest you find a copy of "Taxi Cab Monthly" to continue your search. We're just not sold on two-way radio modifications working for RPU.

The comparison charts that follow should be helpful in selecting equipment that will meet your needs. The data is taken from manufacturers' published specifications and is as accurate as possible, but is subject to variations in measurement techniques, different degrees of conservatism by the manufacturers. Every attempt was made to include all manufacturers of broadcast remote pickup equipment. Prices shown are accurate as of February, 1977 and are subject to change.

Back Packing—Once we have the basic link back to the station under control, we can concentrate on the portable equipment that will enable the reporter to walk right up to the scene. At least two companies make broadcast quality portable transmitters that are designed specifical-

Continued...

It's a very good year...



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- Our **AMM-2 AM Modulation Monitor** features three peak lights and outputs for ATS modulation control.
- Our **AMM-3 AM Modulation Monitor** features separate meters and four peak lights for negative and positive modulation, and also includes outputs for ATS modulation control.
- Our new **AM Frequency Monitor** includes ±10 Hz and ±20 Hz off-frequency alarms, and a loss-of-count alarm.
- Our new **AM RF Amplifier System** permits reliable monitoring with our new shielded loop in a field of 50 microvolts per meter.
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ly for this application. Marti Electronics makes a Model RPT-1 transmitter that weighs just over five pounds and radiates a maximum of one watt (slightly less on 450 MHz). Comrex Corporation builds a model RTA 2.5 watt transmitter that is slightly smaller in size. Both units are available for either VHF or UHF operation. The Marti unit sells for $495. Prices on the Comrex unit start at $900.

Marti is now providing subaudible tone encoding for the RPT-1. The encoder mounts inside the unit, with a companion decoder installed at the receiver. At present, the encoder is single frequency, but conversion to a two-frequency encoder doesn't appear to be a major project. The two-frequency encoder would enable the field reporter to select one of several modes of operation. For instance, if the mobile transmitter is set up for two-frequency, the field operator could select which frequency the repeater transmits on. If a tape recorder is included in the RENG mobile unit, one tone could activate the tape recorder while the second tone would select the repeat mode. The Comrex unit is also available with

RPU comparison charts

VHF SYSTEMS

Make	Marti	Moseley	McMartin
Frequency range	150-172 MHz	148-174 MHz	148-172 MHz
Audio response	±1.5 dB 30-7.5 kHz* 10.7/f30 IF filter	±1.5 dB 30-10 kHz	±1.5 dB 50-7.5 kHz
Distortion	2% max.	1.3% max.	1.5% max.
Signal-to-noise	50 dB	55 dB	55 dB
Dual frequency	optional	optional	optional
Price	$1470	$2095	$1370

Transmitter specs

Model	RPT-40	RPL-3	B-1100T
Power out	40 w. max.	13 w. max.	40 w. max.
Spurious	-60 dB	-60 dB	not given
VSWR protection	yes	yes	not given
Audio input	3 mic/1 line	2 mic/1 line	2 mic/1 line
AC power	115/230v 155w	120/240v 45w	115/230v 120w
DC power	13.6v 7a	13.5v 2a	13v 6a
Dimensions	6¼Hx15Wx12D	4Hx14½Wx11D	5¼Hx19Wx14½D
Weight	20 lbs.	16 lbs.	30 lbs.

Receiver specs

Model	R/30-150	RPL-3	TBM-1100R
Sensitivity	.5μV/20 dB	1μV/20 dB	.8μV/30 dB
Selectivity (-6 dB)	±17.5 kHz	±22 kHz	not given
Selectivity (-60 dB)	±22 kHz	±42 kHz	not given
Spurious	-95 dB	-65 dB	-85 dB
Audio output	600Ω+10 dBm	600Ω+10 dBm	600Ω+10 dBm
Carrier operated relay	yes	optional	yes
Power required	115/230v 30w	120/240v 10w	120/230v 20w
Dimensions	8¾Hx19Wx8¼D	1¾Hx19Wx10D	3½Hx19Wx11D
Weight	16 lbs.	10 lbs.	10 lbs.

*With IF filter

tone encoding.

Marti's CU-40 automatic relay control unit provides interface to operate the RPU transmitter and includes an input and associated logic to engage the transmitter only when the channel is not being used. A monitor receiver is connected to the unit to detect the presence of carrier on the repeat frequency. When a valid sub-audible tone is received the transmitter is switched on and the control unit checks to make sure that the monitor receiver was working by looking for a carrier. If no carrier is received by the monitor during re-transmit, it is assumed that the monitor receiver was not working, and the repeater shuts down.

Comrex manufactures a line of portable equipment primarily designed for cueing applications and audio pickup for television ENG (remember television?). In addition to the RTA transmitter, their model CRA receiver lends itself to RENG. The receiver is lightweight, and is available on any frequency from 50 to 550 MHz. The unit sells for $550.

Comrex also builds a broadcast quality cue/remote pickup transmitter with one watt output on any of the RPU frequencies. It is priced

Continued...

UHF SYSTEMS

Marti	Moseley
450-470 MHz	450-470 MHz
±1.5 dB 30-10.5 kHz*	±1.5 dB 30-10.5 kHz**
less than 2%	less than 1.3%
-50 dB	-55 dB
optional	optional
$1840	$2395
RPT-25	RPL-4
25 w. max.	13 w. max.
-60 dB	-60 dB
yes	yes
3 mic/1 line	2 mic/1 line
115/230v 155w	120/240v 45w
13.6v 7a	13.5v 2a
6¼Hx15Wx12D	4Hx14½Wx11D
20 lbs.	16 lbs.
R-50/450	RPL-4
.5μV/20 db	1μV/20 dB
±21 kHz	±44 kHz
±28 kHz	±75 kHz
-95 dB	-65 dB
600Ω+10 dBm	600Ω+10 dBm
yes	optional
115/230v 30w	120/240v 10w
8¾Hx19Wx8¼D	1¾Hx19Wx10D
16 lbs.	10 lbs.

*12,000 with F100 IF filter

**15 kHz on special order

Manufacturers of RENG equipment

Comrex Corporation
Box 269
Sudbury, Massachusetts 01776
617/443-5077

Marti Electronics, Inc.
Box 661
Cleburne, Texas 76031
817/645-9163

Moseley Associates, Inc.
111 Castilian Drive
Goleta, California 93017
805/968-9621

McMartin Industries Inc.
4500 South 76th Street
Omaha, Nebraska 68127
402/331-2000

Kahn Communications, Inc.
74 North Main Street
Freeport, New York 11520
516/379-8800

RENG: RPU Roundup

(Continued)

at $650. Although it is designed for 110 volt operation, it could be used for return cue in a mobile RENG system by using an inverter.

Until recently, one of the problems in setting up a mobile RENG unit has been providing space and power for a rack mounted RPU receiver for the portable unit. It takes a pretty good receiver to maintain broadcast quality audio and reject spurious and image signals adequately. Remember that the receiver is going to be used at the scene of disasters and other events where there is a lot of communicating by police, firemen, CB, etc. We really don't want our big scoop of the week interrupted with "Breaker one-nine" and other similarly clever phrases.

Marti Electronics promises to introduce a mobile receiver for this application in the very near future. Monitoring, tone decoder, and audio filter for the sub-audible tone will be built in. The unit operates on 12 v.d.c. and is 3½ inches high by 14¼ inches wide by 13 inches deep. The price should be similar to their rack mounted receivers.

Sky Hooks—Antennas for RENG are readily available. You'll need a receive antenna to pick up the portable unit, and a transmit antenna for the RPU transmitter. The transmit antenna can be used for the required monitor receiver by switching with an antenna relay. Marti and Moseley both carry a line of RPU antennas. (See 1976 September Buyer's Guide, page 79 for complete list of RPU antenna manufacturers.) In most cases, communications type antennas serve the purpose very nicely. Even antennas designed for amateur radio work fine as long as they're trimmed to your operating frequency. Just keep an eye on the condition of the less expensive units. They tend to deteriorate faster than the more expensive commercial units.

An RPU "Footwarmer"—Moseley Associates manufactures an RF power amplifier that enables you to extend the range of an RPU transmitter. The AMP-3 provides 6 dB of gain for a VHF transmitter with an output of 13 watts or less. The AMP-4 provides 5 dB of gain for UHF units under 10 watts. Both units require 12 volts for operation, and need no direct control. Application of RF drive activates the amplifier. The AMP-3 and AMP-4 sell for $225 and $275, respectively.

A QKT Cure—While somewhat out of the scope of this article, the Kahn Voice Line Reporter deserves mention if for no other reason than the fact that the unit is unique. The basic idea is that the low frequency information that would normally be lost on a low grade phone line is encoded and sent in a narrow notch at 2,000 Hz. The receiver strips the noise below 300 Hz and reinserts the 100 to 300 Hz information. Actually the Voice-Line has been out for several years, but the new model appears to be more ideally suited to RENG. An acoustical coupler for use with a standard telephone and a space to mount a cassette recorder make the unit look ideal for a newsman to carry. The 7½ pound unit sells for $1,495 and requires an $840 receiver to complete the system.

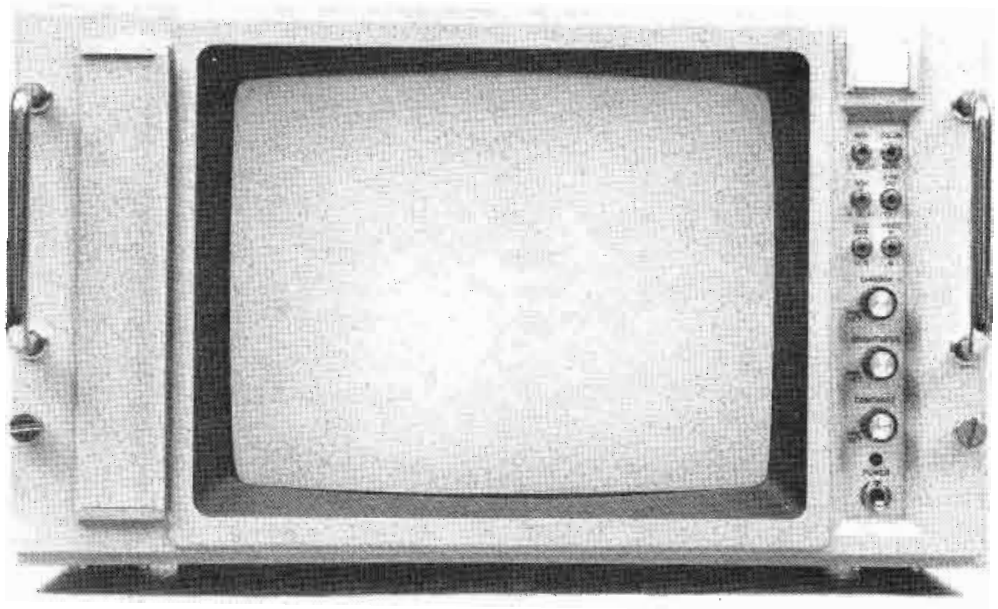
Space doesn't allow us to extend this discussion to peripheral equipment such as mixers, cassette recorders, etc. In general, there is a great need for field equipment that meets the specific requirements of RENG. One of the problems facing manufacturers is the relatively narrow market. To produce a cassette recorder that would meet our needs, the selling price would have to be up somewhere around a kilobuck. While some stations would feel the expense justified, most would continue to use consumer type equipment at about one tenth the cost.

For more information on any of the units described here, you may contact the manufacturers directly. Their addresses are listed here for your convenience.

The **Radio Workshop** would like to thank all of the manufacturers who have been very helpful, and in particular, David Ottalini, News Director, KWTC, Barstow, California, for providing a great deal of information on RENG.

Next month:
Get Ready For An FCC Inspection. □

It takes guts to run your video through an Ikegami broadcast monitor.



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There are both pre-set and adjustable controls. Video response is from +1 to –2 dB from 60 Hz to 8 MHz.

It has extemely rigid, sturdy construction and is available in a free-standing cabinet or for standard 19-inch rack mounting. Its built-in degaussing circuit and magnetic shield to fend off external magnetic effects make it possible to move the Ikegami monitor without affecting its picture.

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You can get an optional remote control for brightness, contrast, and chrome.

We really shouldn't have to give you all the specs. The name Ikegami alone is enough to tell you how good they are. But if you do insist on more, ask Ikegami. Ikegami, the leading manufacturer of ENG cameras, manufacturer of the best in studio cameras, and now the best in monitors, too.

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Directional Antenna Basics

Part 2 of a Series/By Robert A. Jones

This is Part II of our continuing series on the understanding and design of directional antenna systems. In this part I will direct your attention to the simplest of directional antenna patterns, the basic two-tower.[1]

Need For Directionals

At this point it might be interesting to look at some of the reasons or necessities for installing directional antennas. By far the most common reason is the need to protect a station already on a channel. Designing a DA to obviously interfere with a fellow broadcaster is not considered "playing the game." In other words, all new stations must afford protection to existing stations.

A second common reason for the use of directional antennas is stations seeking power increases. These would be cases where a straight non-directional power increase would overlap some other station.

A third reason, not as common as those above, would be to prevent useless radiation over areas where no people live. A classic example would be a non-directional station located on the sea coast.

Basic Pattern Concepts

Figure 1 shows the typical pattern with its ground system. This is identical to that in Part I and is redrawn to show the comparison of this to our mathematical approach. You were hoping we could do it all without math? Sorry. I'll try to keep it simple and explain every term and/or step and give examples by using actual stations' patterns.

Figure 2 represents the vector approach to this same two-tower directional pattern. Picture the view looking down from an airplane at 1000 feet over the top of the array. The tower signs represent the top view of the towers. Now take an engineer and place him on the ground at a distance of a mile away, at some angle (Θ) off the tower line. This engineer uses his field intensity meter to measure the "total signal" so that he can tell us what radiation we have at his particular bearing. If we had this engineer walk a circle around our pattern, taking readings of signal intensity at every 5° point, we could plot his readings and "see" the complete shape of our directional pattern.[2]

In design with the use of simple mathematics, we can predict the signal our engineer would measure had he stood one mile away in any given direction.

I said our engineer would measure the "total signal." Let me explain this term. Each tower radiates its own signal. In our example, two individual signals will arrive at the point where our engineer is standing. His field meter is not able to differentiate between the separate individual signals. He reads the combined signals. Hence the reading on his F.I. meter represents the "total" signal. If we had three towers, our total signal would be the vector sum of these signals, and so forth.

Oh-oh, what is this vectorial sum business? This is just a mathematical way of saying the two signals add in a relationship defined by the design of the pattern.

Point "P" in Figure 2 represents the spot where the engineer is standing with his field meter. Towers One and Two are marked

Continued...

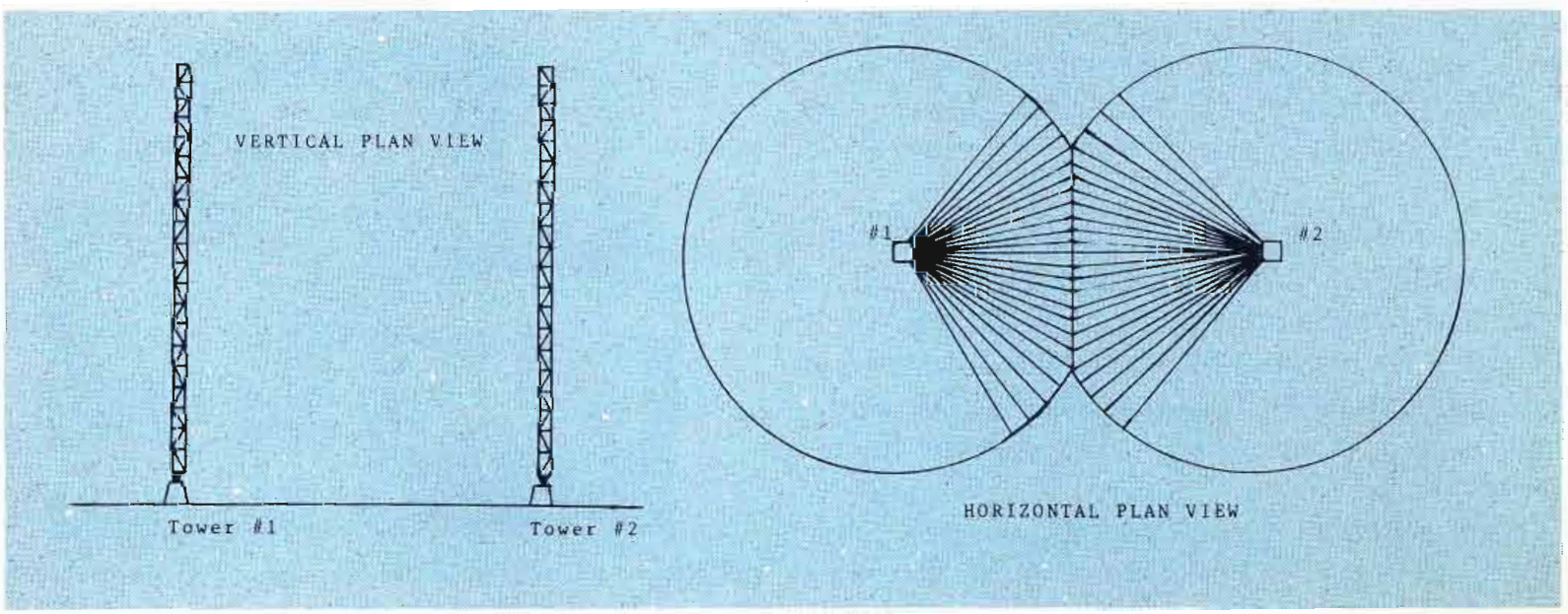

Figure 1.

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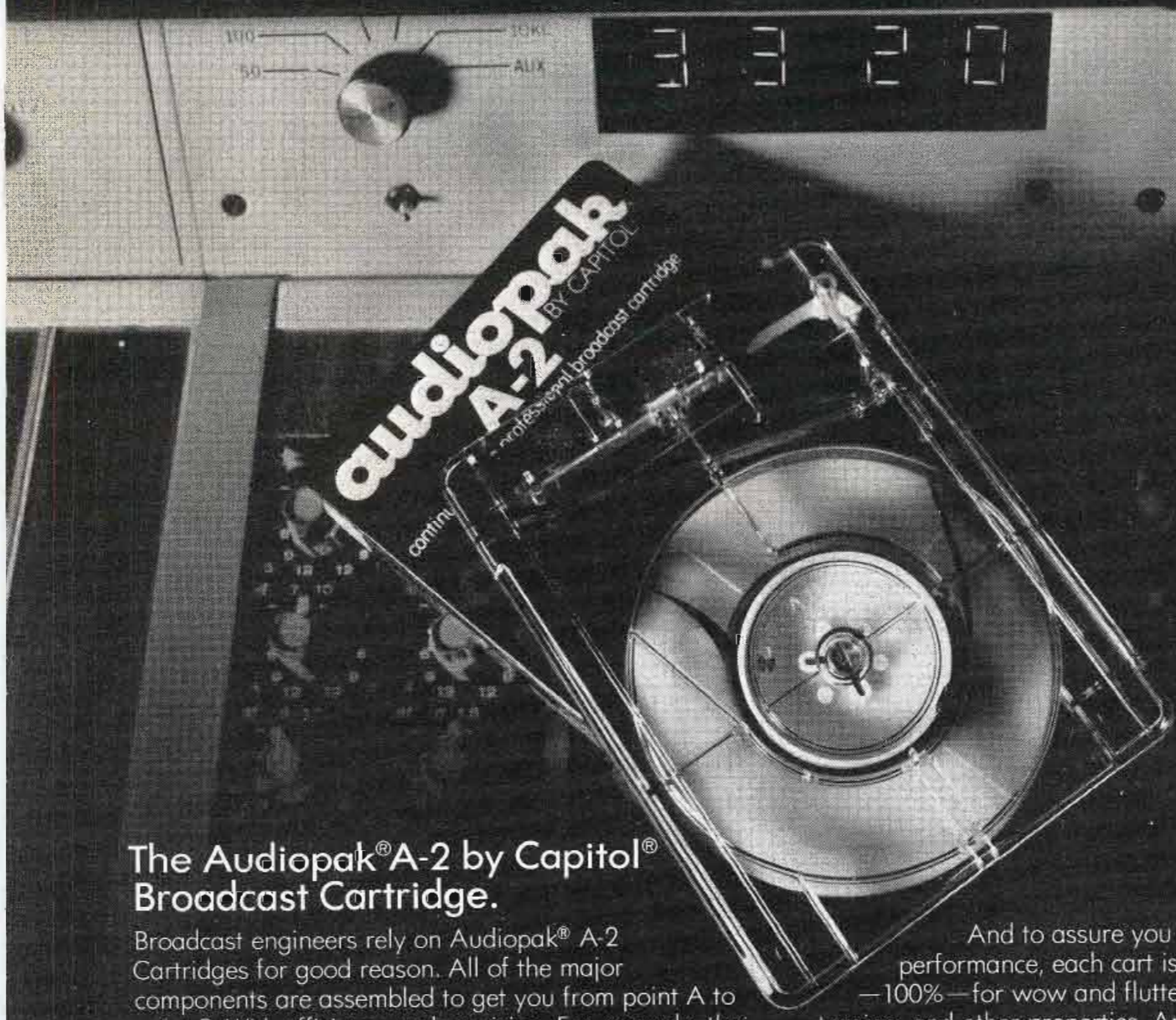

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by appropriate numbers. The letter "S" represents the electrical spacing between the two towers, normally expressed in degrees. These two towers lie along the same tower-line, referred to as T.L.

The signal from Tower Number One to our engineer observer follows the arrow from #1, which in relation to the tower-line is an angle of Θ. The same angle is assumed to exist from Tower Number Two. Now you may say that the signal from Tower Two should not be the same angle since this can only occur if the two vectors are parallel. You are correct. However, in theoretical design we assume the path to each tower from the observer is parallel, even though in reality it is not. This is one of the concepts you may have difficulty accepting. I would qualify this by saying the design engineer assumes them to be parallel lines when he is standing at a distance of greater than ten times the tower spacing. The reason for this is that mathematically the sine and the tangent of angles less than 6° are equal.

Now that we have defined the terms, let's see what happens to the two signals. Tower One is our reference tower. So its signal is arbitrarily taken as the basis for comparing the signal relationships of all the other towers in any directional antenna pattern.

If we assume our engineer is standing at point "P", then the sum total signal he observes is the resulting addition of the two individual tower vectors. If we assume the two towers have equal currents, then the only thing which can affect the vector sum at point "P" is the phase relationship between the two signals. Two factors control this relationship. One factor is the phase angle between the currents induced into each tower. This is the angle you might measure on your station antenna monitor.

The other factor is the "space phase", due to the difference in the length of the paths from each tower to point "P". For example, if point "P" were at right angles to the tower-line (T.L.) the path lengths would be equal. If this same point "P" were along the tower- "space phase" would be equal to

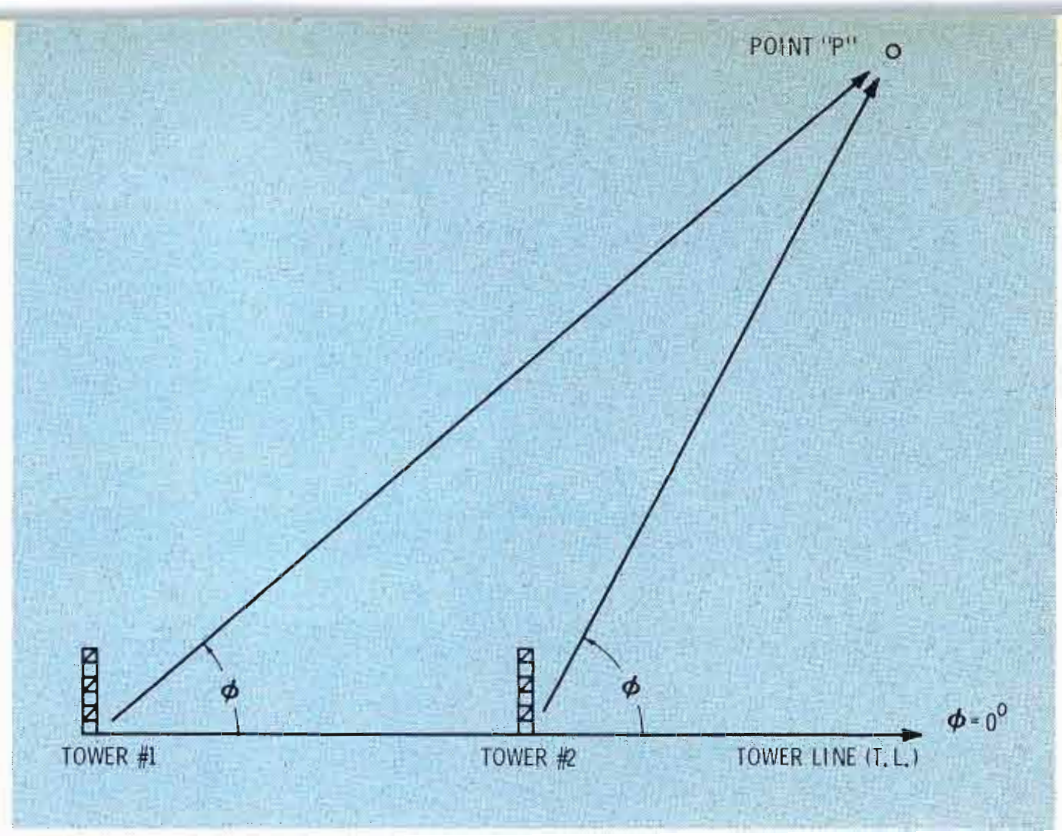

Figure 2.

the electrical spacing (in degrees) between the two towers. The reader can see that the "space phase" will vary between zero and S. The rate at which it varies can be expressed by this simple formula of equation 1.

$$\text{Space Phase} = S \cos \Theta$$

The variation is the cosine of the angle (Θ) off the tower-line. Since Θ equals zero along the T.L., and the cosine equals 1.00, "space phase" equals "S". Also when Θ=90°, the cosine of the "space phase" equals 0, or the condition of equal path lengths. Thus our formula works.

This "space phase" relationship is shown in Figure 3. Point "X" is at the corner of a right triangle formed by the tower spacing and "S cos Θ."

Obviously the distance from Tower Number Two is greater than the distance from Tower Number One by the length between point "X" and Tower Number Two. As shown, this length can be calculated by equation 1. All we need to do to predict the space phase for any given bearing to point "P" is multiply the term S by the cosine of the bearing angle, as measured from the tower-line.

I might point out here that computations for directional patterns having two towers need be calculated over just one-half of the circle. This is because any two-tower pattern is symmetrical about its tower line. For example the "total signal" at 110° off the T.L. was to be the same as that at 250°, i.e. each side of the T.L. is the same at its corresponding angle. In other words, the right hand side mirrors the left hand side.

Now that we have all the terms, let's put them together and see the result. We have the combination of two signals or two vectors at point "P". The reference tower is always assumed to be a vector of 1.0 units in length lying at an angle of 0°. This is the vector #1 in Figure 6. The vector from Tower Two is the same length as Tower One, because we assumed equal currents. Tower Two's angle of relationship to that of Tower Number One's vector is affected by the two phases discussed above. These two factors are added as follows.

$$\beta = \Psi + (S \cos \Theta)$$

The first term is the Greek letter "phsi" and stands for the phase angle between individual currents, or the value you might read on your station's antenna monitor. This is a constant value for any given pat-

Continued...

References

1. Jones, Robert A.: *Two Tower Test,* Broadcast Engineering, February 1968.

2. Jones, Robert A.: *Aeronautical F.I. Meas.* Broadcast Engineering, March 1965.

NCAA Football lead-in courtesy of ABC Sports and Image West.

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Directional Antennas
(Continued)

tern. The last part of equation 2 is the space phase from equation 1. The Greek letter (β) "beta" represents the combined angle, at any given bearing, and expresses the angle between the Tower Number One and Tower Number Two vectors at point "P".

For example, when $\beta=0°$, our resultant total signal is the sum of the two vectors, I_1, I_2,=2 I units. If however $\beta=180°$, the vectorial sum will be 0 units. Thus the angle of β really controls the vectorial sum, which controls our pattern shape. If I assume $\Psi=90°$, and $S=90°$, I would find the following vector sums shown in Figure 5, at 0°, 45°, 90°, 135° and 180° off the towerline.

In the early days of designing directionals, many engineers simply plotted up the vector sums at 10° intervals and thereby determined their overall pattern shape. It is usually a bit more professional to compute these vector sums at 5° intervals, except in cases where a smaller angular change is important. In Table I the tabulation used to compute these vector sums is shown. The operation shown at the top of each column in Table I is performed, and each column in

Continued...

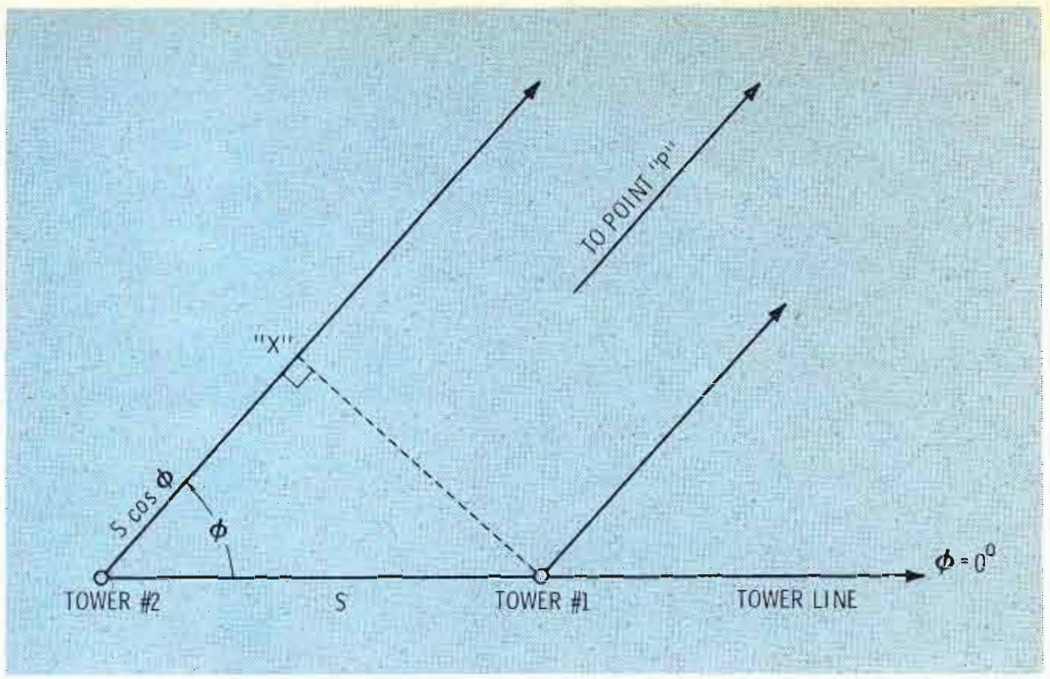


Figure 3.

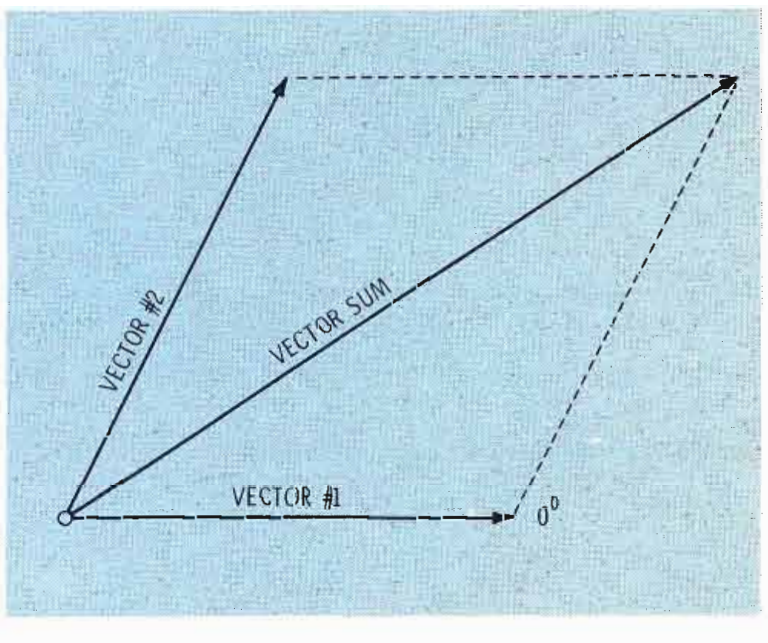
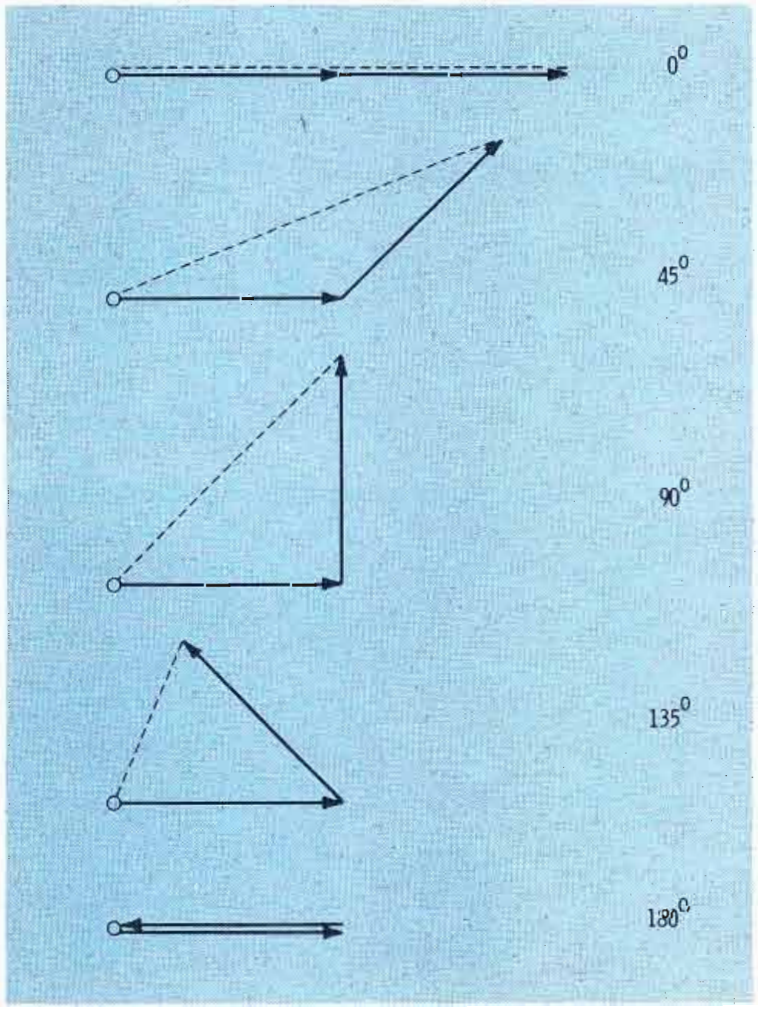


Figure 4.
Addition of two mathematical vectors.

Figure 5.
Variations in phase angle between vectors.



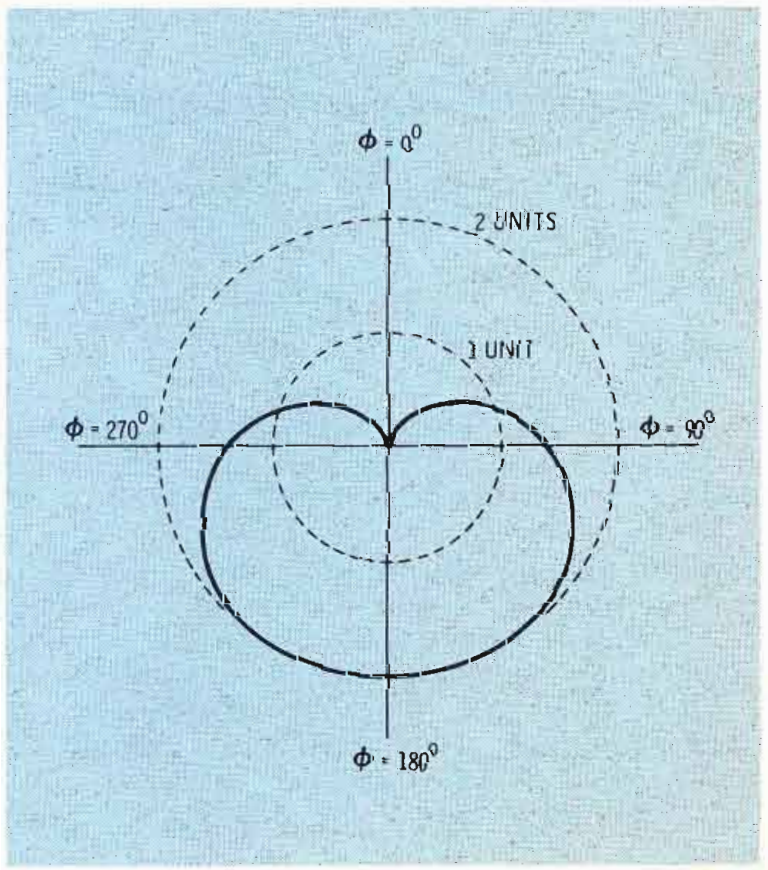


Figure 6.
Polar graph of unit vectors.

TABLE I
CALCULATING UNIT VECTORS

$$E = f(\theta)\left[F_1/0^0 + F_2/\psi + S\cos\phi\cos\theta\right]$$

SUBSTITUTING = $1.0[1.0/0 + 1.0/90^0 + 90^0\cos\phi \cdot 1.0]$

A → B → C → D → J

A	B	C	D	E	F	G	H	I	J*
ϕ	90 cos A	90 + B	cos C	1 + D	E^2	sin C	G^2	F + H	$\sqrt{I}$
0^0	90.0	180.0	-1.000	0	0	0	0	0	0
10^0	88.6	178.6	-.999	.001	.000001	.024	.00059	.00059	.024
20^0	84.5	174.5	-.995	.005	.000025	.096	.0092	.0092	.096
30^0	77.9	167.9	-.978	.022	.00048	.209	.0439	.0444	.211
40^0	68.9	158.9	-.933	.067	.0045	.359	.129	.134	.366
50^0	57.8	147.8	-.846	.154	.0237	.533	.284	.308	.555
60^0	45.0	135.0	-.707	.293	.0858	.707	.500	.585	.765
70^0	30.8	120.8	-.512	.488	.238	.858	.737	.976	.988
80^0	15.6	105.6	-.269	.731	.534	.963	.928	1.462	1.209
90^0	0.0	90.0	0.000	1.000	1.000	1.000	1.000	2.000	1.414
100^0	-15.6	74.4	.269	1.269	1.610	.963	.928	2.538	1.593
110^0	-30.8	59.2	.512	1.512	2.286	.858	.737	3.023	1.738
120^0	-45.0	45.0	.707	1.707	2.914	.707	.500	3.414	1.848
130^0	-57.8	32.2	.846	1.846	3.408	.533	.284	3.692	1.921
140^0	-68.9	21.1	.933	1.933	3.736	.359	.129	3.865	1.966
150^0	-77.9	12.1	.978	1.978	3.912	.209	.0439	3.956	1.989
160^0	-84.5	5.5	.995	1.995	3.980	.096	.0092	3.989	1.997
170^0	-88.6	1.4	.999	1.999	3.998	.024	.00059	3.998	1.999
180^0	-90.0	0	1.000	2.000	4.000	0	0	4.000	2.000

*REPRESENTS LENGTH OF UNIT VECTORS

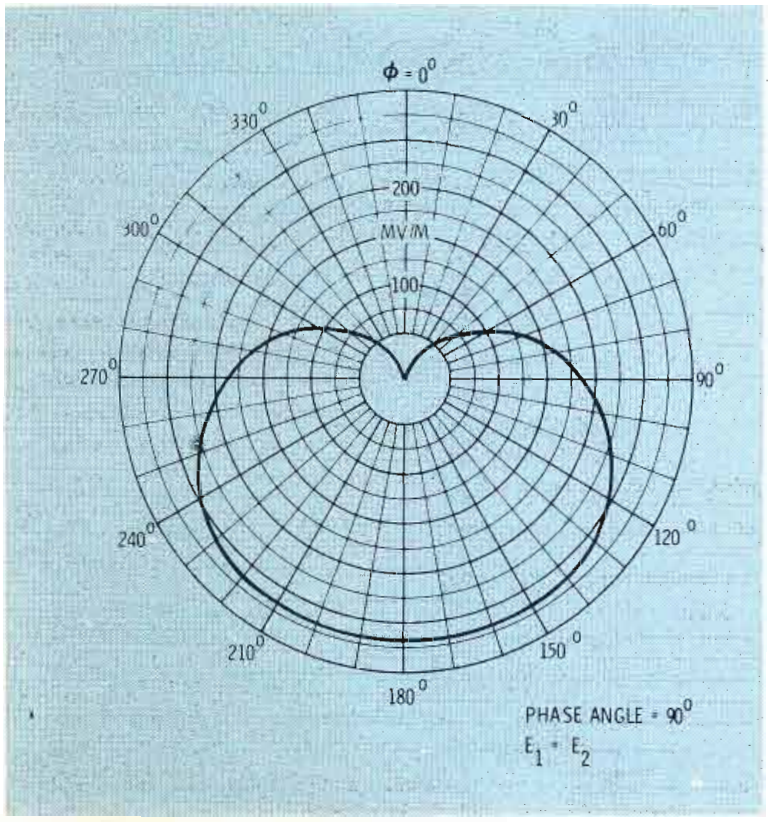


Figure 7.

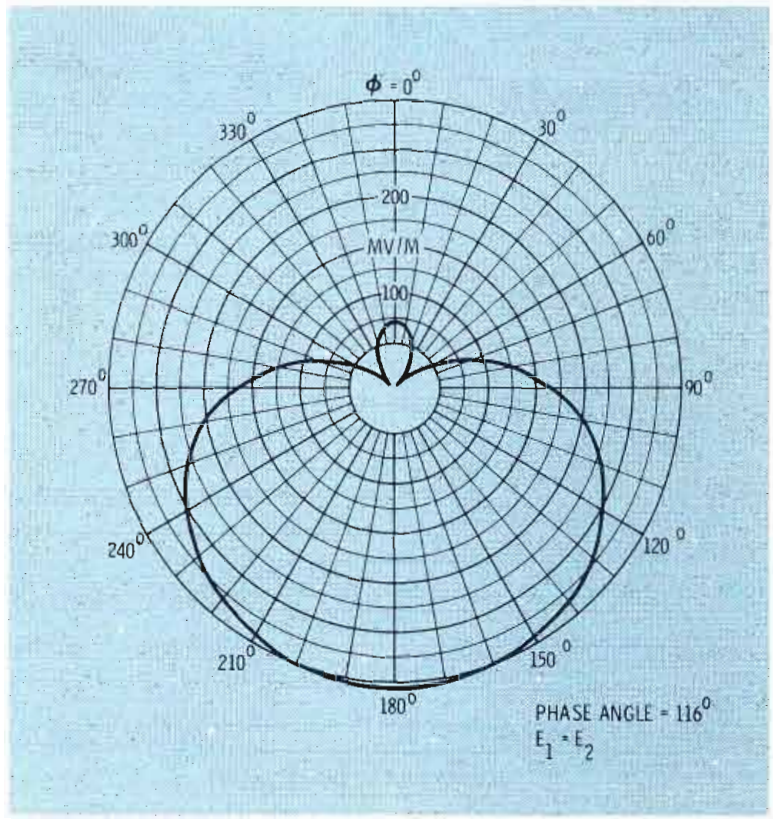


Figure 8.

TABLE II
CONVERTING UNIT VECTORS TO F. I.

$E_T = K [E_{unit}]$ MV/M

A	B*	C	D
ϕ	E_{unit}	B^2	K·B
0^0	0	0	0 MV/M
10^0	.024	.00059	3.2 "
20^0	.096	.0092	12.9 "
30^0	.211	.0444	28.4 "
40^0	.366	.134	49.3 "
50^0	.555	.308	74.8 "
60^0	.765	.585	103.1 "
70^0	.988	.976	133.2 "
80^0	1.209	1.462	162.9 "
90^0	1.414	2.000	190.6 "
100^0	1.593	2.538	214.7 "
110^0	1.738	3.023	234.3 "
120^0	1.848	3.414	249.1 "
130^0	1.921	3.692	258.9 "
140^0	1.966	3.865	265.0 "
150^0	1.989	3.956	268.1 "
160^0	1.997	3.989	269.2 "
170^0	1.999	3.998	269.5 "
180^0	2.000	4.000	269.6 "
		38.056	

*COLUMN J FROM TABLE I

38.056 (19 BEARINGS)
x 2
76.112 (38 BEARINGS)
-0.0 (-FIRST BEARING)
-4.0 (-LAST BEARING)
72.112 (36 BEARING)

$$K = \frac{196 \text{ MV/M/KW}}{\sqrt{\frac{72.112}{36}}}$$

K = 134.8 MV/M/KW

Directional Antennas
(Continued)

turn is modified, or processed by the next adjacent one. Column "J" represents the vectorial sum expressed in units. These are plotted on Figure 6.

Computing Power

In order to relate our unit vector pattern to some specific size we need to know the power of the designed station as well as the RMS efficiency of the pattern. For any given pattern shape we will have an RMS efficiency for 1 kW, for 500 watts, or even for 50 kW. The relationship between these RMSs varies according to good old "Ohm's Law". Normally we use the RMS at 1 kW as a standard, hence by simple Ohm's Law the RMS at any other power is the square root of that power divided by 1 kW, times the RMS at 1 kW. This is shown in equation 3.

$$RMS_{(X \text{ Power})} = RMS_{(1 \text{ kW})} \times \sqrt{\frac{X \text{ kW}}{1 \text{ kW}}}$$

You may now ask how does one know what the RMS efficiency is for a given pattern? This is calculated by a formula known as the Bessel Function Method. For now let's pass over this step and see how you apply the RMS efficiency to the unit vector pattern you computed in Table I.

In our example, assume we calculated the RMS efficiency to be 196 MV/M for 1 kW, and we plan to operate at 1 kW. By definition, the RMS of any pattern represents the radius (in MV/M) of a circle which will contain the same total area as the area which is encompassed by our pattern. Thus the area of our pattern is πR^2.

Continued...

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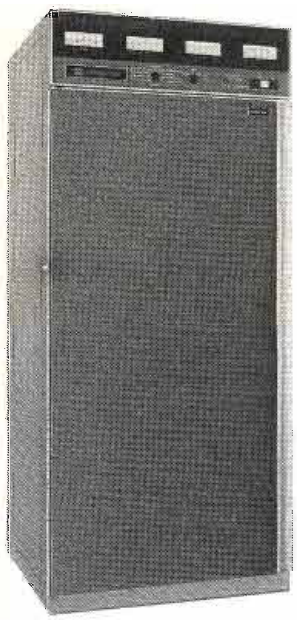
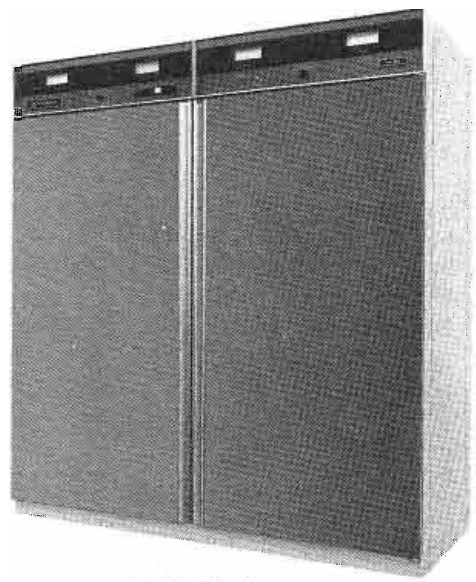


MW-1A, 100% solid-state one kilowatt transmitter

MW-50A, fifty kilowatt transmitter



MW-5A, five kilowatt transmitter

For More Details Circle (17) on Reply Card

Directional Antennas
(Continued)

In order to convert our pattern shape to this area, we need a conversion factor. This is commonly referred to as "K". "K" is the constant by which each vector sum is multiplied to arrive at our final pattern expressed in MV/M. This is determined from equation 4.

$$K = \frac{\text{RMS efficiency}}{\sqrt{\frac{\text{RMS, unit vectors}}{\text{No. of bearings calculated}}}}$$

For the RMS efficiency in our example I assumed 196 MV/M. The number of bearings calculated, means the number we computed, normally 36. The RMS of the unit vectors is found by taking each of the individual vector sums, shown on Table I, column "G" for each of the 36 bearings; squaring that value; adding up the total, dividing by 36 and then taking the square root. In fact RMS stands for the root-of-the-mean-of-the-squares.

Table II shows how I've taken the unit vectors of Table I, Column "G", squared them, added them, determined "K" by equation 4 and applied that factor to arrive at our final pattern. This is plotted on Figure 7.

Nulls And Lobes

If the currents in the two towers are not precisely equal, their individual vectors will not perfectly cancel at some bearing and cannot produce a pattern null having zero MV/M. In design the engineer will often use unequal currents in order to "fill in" a given null, thus giving a more stable pattern, and one that is easier to adjust, since I have yet to find anybody who can tune to a null of zero MV/M.

In our example we used a phase angle (Ψ) which gave us just one pattern null. If instead of $\Psi=90°$, I had used $\Psi=116°$, the resulting pattern of Figure 8 would be obtained. This example produces two nulls, with a minor lobe in between. Thus it is the phase angle Ψ which is important in producing the number of nulls, as well as their placement angle along the tower-line. The current ratio, as noted, will affect the depth of the nulls and will also affect the amplitude of any minor lobes. As the nulls fill in, the lobes will grow.

Different Bearings

The reader should note that math angles are not the same as bearing angles. Mathematical convention established that math angles are measured counter-clockwise from the X-axis (east). Navigational Convention has established that bearings be noted clockwise, beginning at true north. This would correspond to a math angle of $+90°$. Not only does each system have a different reference point, but the angles are measured in opposite directions. Conversion from one system to the other is therefore obvious.

In following months I'll expand upon this basic two-tower pattern by showing some of the modifications with their formulas, and how these result in shortcuts to computing the final pattern. In addition, some basic computer programs will be explained. □

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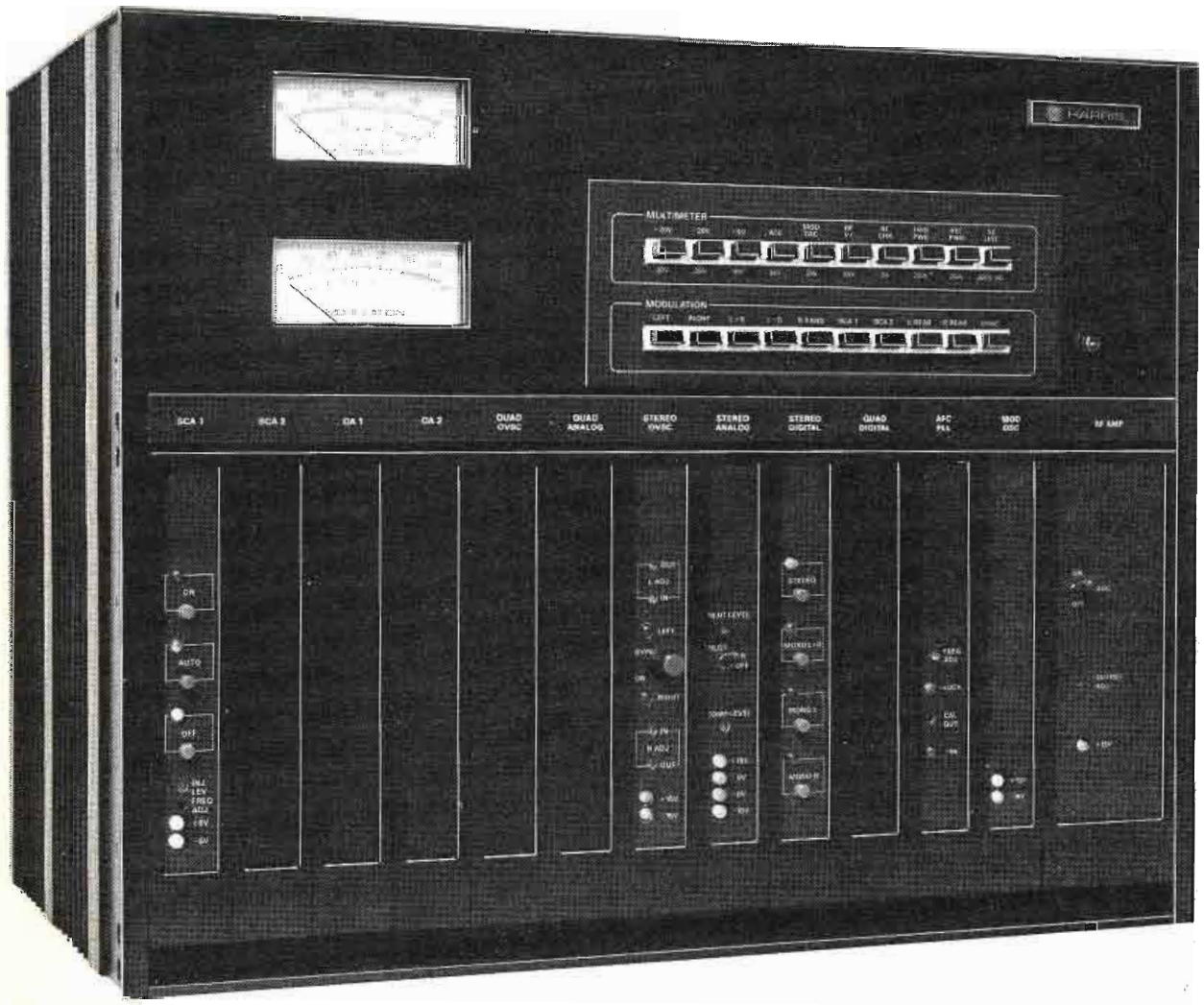
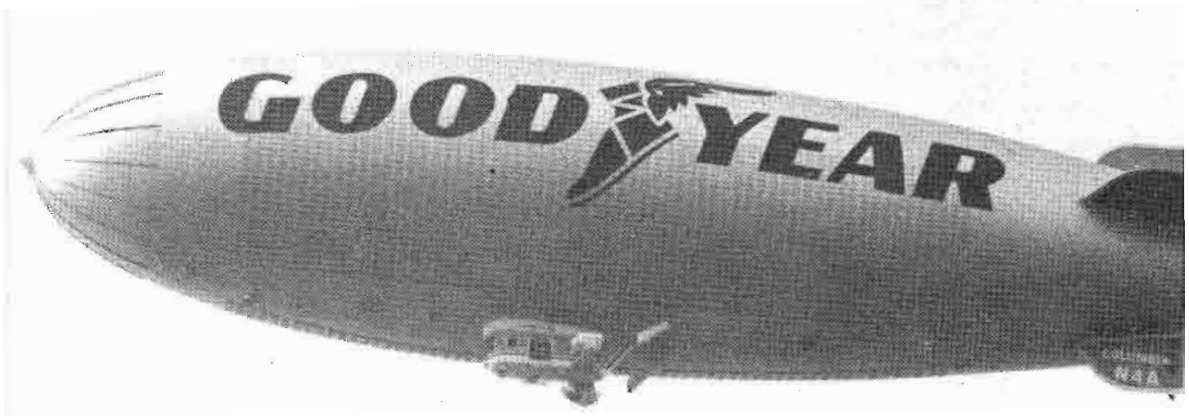


For More Details Circle (29) on Reply Card

Digital Framestore Synchronizers



By Joseph Roizen

Photo by Donna Foster Roizen

If you were impressed by the incredible closeups of Frank Shorter during the Marathon in Montreal, if you wondered about the live remotes from the Republican National Convention, or if you were amazed by score overlays on TV pictures from the Goodyear blimp at the Superbowl, then you were watching all of these color images coming through one of television technology's newest marvels, the digital framestore synchronizer.

With all of their options, these newly compacted devices can synchronize wild feeds from any source, compress pictures into one quarter of smaller sizes, manipulate the video signal for unusual special effects, and even freeze single fields or frames when that is necessary or desirable.

Framestores are very new, the first one having been introduced to network television by NBC in April 1974 in connection with coverage of championship tennis in Germany. The NEC FS 10B used at that time was not only rack mounted; it occupied a full rack, stood six feet, nine inches tall and weighed in at 550 pounds. Even at that, it only stored one field at a time. In the three short years since this historic first, framestores have shrunk to more manageable size and weight. Currently, several models are nine inches tall and weigh less than 100 pounds. What is more important is that additional operation features have been added to the basic framestore capability so that wide window time base correction, veloci-

Continued...

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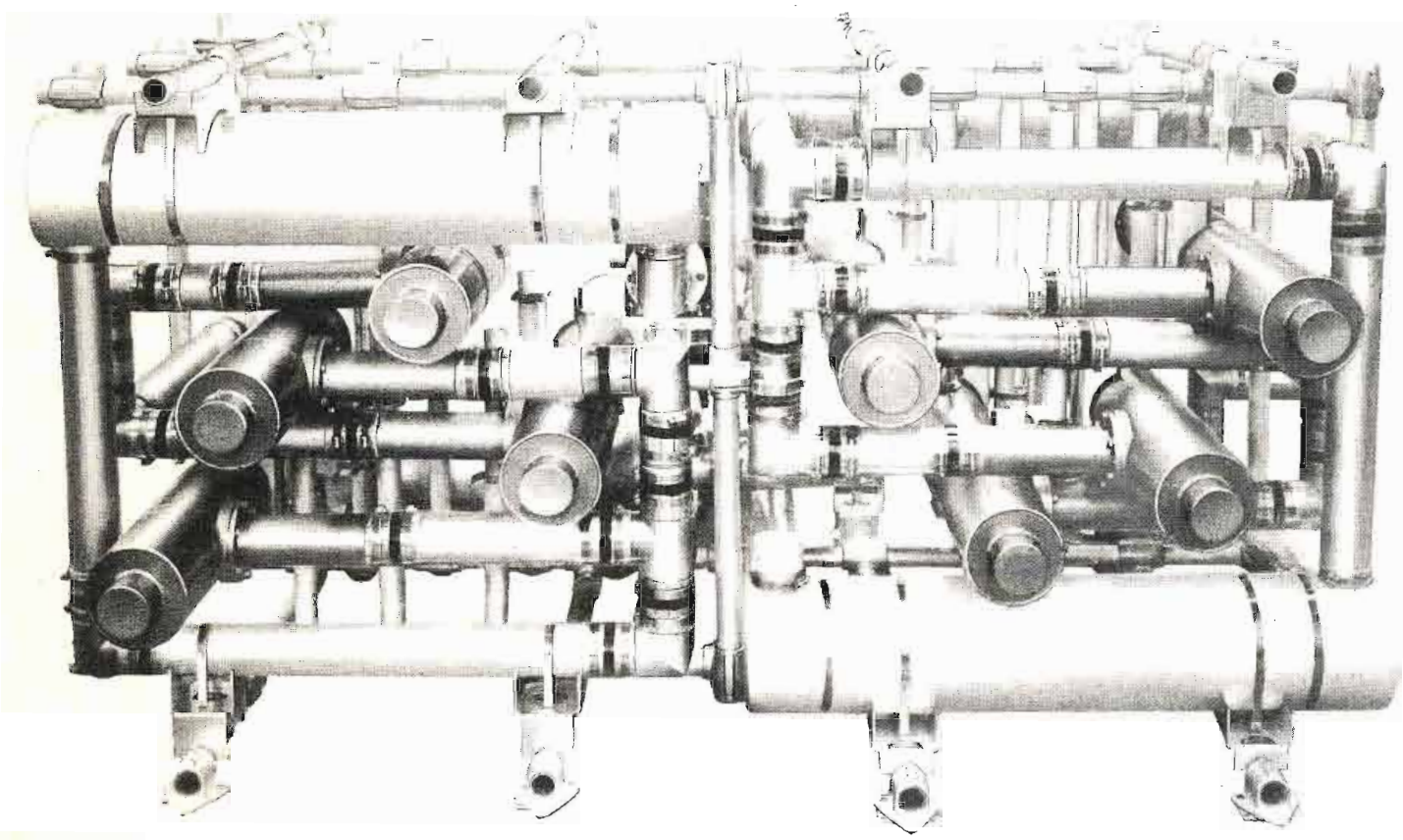
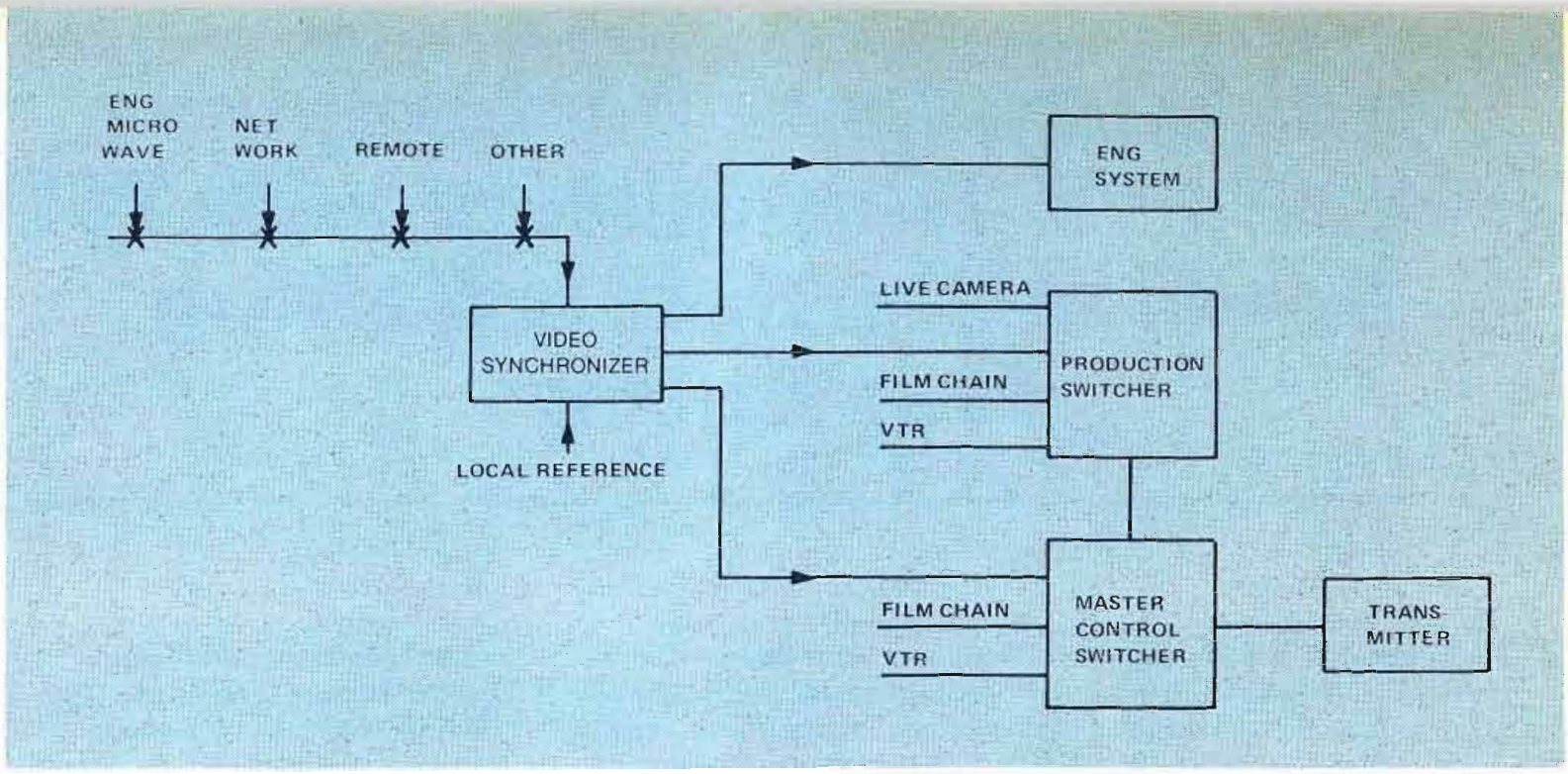
Harris' new TSB filter...actual size



Conventional VSB filter... over 280 cu. ft.



Synchronizers

(Continued)

ty compensation, video compression, image multiplexing, field/frame freeze and unusual special effects can all be done with these units depending upon the configuration or optional additions.

All of this has been made possible by the rapid strides in solid state circuitry which have provided 4K random access memory (RAM) chips that are small and reasonably priced. Even now, a new wave of 16K RAMS will further improve the size/performance ratio of the newer framestores.

Digital framestore synchronizers are not cheap; the entry fee is about $50,000 and with all the bells and whistles, the price tag can go beyond $80,000. The good news is that the DFS not only makes operations simpler and easier, but adds production capabilities which

Continued...

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Synchronizers

(Continued)

are salable to clients, thereby warming the hearts of the station managers or accountants who are usually only interested in that magic term, ROI (Return On Investment).

DFS units are steadily moving into the broadcast industry in spite of their steep dollar thresholds. They are doing so because of what they do and how they do it, and while the four major manufacturers (NEC, Micro Consultants, RCA and CVS) claim varying features, the general principles are the same and will be described here.

Analog To Digital And Back

The first thing a framestore must do is have its video signals in digital form so it can store them in discrete uniform bits. The incoming video signal is sampled at three or four times the color subcarrier frequency (10.738 or 14,318 MHz) and converted into an eight-bit form. The analog to digital process is done by a coder and the conversion back to analog by a decoder. Since every framestore synchronizer or digital TBC needs such a pair, it is called a "codec" and represents a fundamental building block in the system. The codec simply accepts normal video, converts it to digital form, then converts the digital signals back into standard video at the output to feed the following equipment in the chain. A good codec degrades the video signal very little and experiments have shown that several cascaded codecs still produce an acceptable picture.

In an attempt to prove the limits of such A/D/A conversion, Ampex engineers put seven codecs in series before noticeable degradation began to appear. The current controversy in this field is whether the sampling rate should be at three or four times subcarrier. Proponents of the X3 method claim it costs less, needs less interconnects, and is more reliable. The X4 adherents point to improved resolution (due to more samples), less picture impairment allowing more conversions and sampling positions that sit on the quadrature points of the subcarrier cycle. In particular, the last

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Synchronizers

(Continued)

factor is supposed to provide easier manipulation of the digital bits if they are accessed by external devices for special effects.

Codecs are also getting smaller and less expensive. Using special hybrid ICs, Tektronix recently showed a new unit that was half the price and considerably compacted when compared with current units.

The Framestore

The active picture memory in a synchronizer can be either a field or framestore. The field store needs only half as much memory capacity, but it limits the flexibility of the entire unit. There is a half-line vertical displacement of the output under certain conditions because the rate of input versus output of the video signal is different. Field stores also cannot handle non-synchronous switches and can adversely affect the VITS and VIRS signals.

Most better synchronizers now store frames. Holding a clean field of video, they can hot switch to a new source without sync loss, vertical rolls, or horizontal tearing are eliminated regardless of the phase of the incoming non-synchronous video. This feature produces a curious effect when working with a remote signal which may fade or disappear for short periods of time. A sudden loss of signal will cause the framestore to freeze on the last good image and keep repeating it until a good new video signal is available, at which point it will unfreeze and continue as though nothing had happened. For remote pickups when the pictures are coming from a vehicle that may suddenly go through a tunnel or get into a microwave blind spot, this is a very useful feature.

A typical framestore has a solid state memory with a capacity for three or four million bits of information. Conversion at an eight-bit rate gives 256 discrete levels for the video signal. This is considered quite adequate for broadcast quality pictures.

Synchronizer Operation

Incoming video is separated into

Continued...

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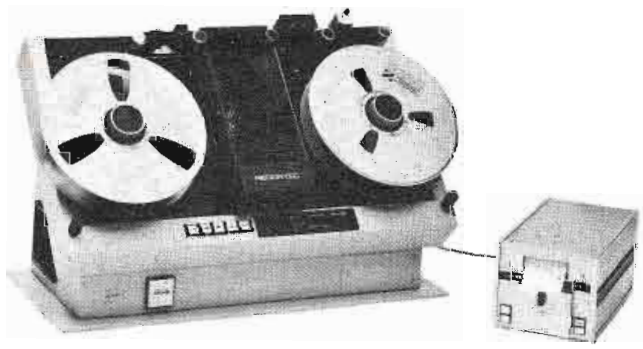

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Synchronizers (Continued)

two channels. Sync and burst are used independently to determine incoming time base errors and to address each picture point to its correct place in the memory. The stored signal which has come through the A to D converter can now be clocked out by a generator locked to studio sync and subcarrier. Under these conditions, the framestore is a window of infinite length (since it holds a whole frame) and there is no need to genlock the studio to the remote signal since the framestore becomes the buffer between the two non-synchronous sources. As the digital signals leave the framestore, they go through a reverse conversion in a D to A converter which makes analog video out of them.

A video processor and sync pulse generator combine to form new sync, blanking and burst that are inserted in the video for a cleaner composite output signal. Having the video signal in a digital form obviously makes it possible to perform other functions on it, and these include both the time and space domains.

Compression

Reading out the stored digital bits at rates not equal to the normal TV scanning standards will produce images that are compressed (or expanded) in size on the monitor screen. Manipulation of the relative read timing positions the compressed picture in any corner of the screen, thus providing an easy way to insert a commentator at a sports event without requiring special and delicate aiming of the camera. Even double compression can be done to get 1/16th images interspersed with ¼ or full screen pictures. As the software systems develop to manipulate the digital video bits with ever increasing sophistication, it becomes possible to do many things that have hitherto depended on film for accomplishment. Already demonstrated have been framestore accessories which produce continuous compression from full screen to infinity, hall of mirrors effects, image turnaround in any place, sectional magnification and many other computer-controlled effects too numerous to mention.

Applications

As an instant action tool, framestores get quickly assigned to doing those hot stories that American television is justly famous for. Much of ENG depends on integrating a live news feed from a remote camera into the studio's daily news coverage. Framestores avoid the danger of genlocking the studio to an outside source and add a smoothness to switching in or overlaying the wild feed without picture breakup. The ultimate use of this feature was at the Republican National Convention in Kansas City last August when CBS, using a flotilla of Minicams, Microcams and flash units, hooked up six framestores (one per feed) ahead of their switcher so that everything coming in was synchronous at the switcher input.

During sports or news programs when a commentator in one corner is an advantage, the compression feature makes it easy for the director to get the picture combination needed. No crayon marks on the viewfinder, no heads getting out of the frame with slight movement and no jangled nerves on the camera operator trying to corner the subject on the little monitor; instead, the full shot is shrunk proportionately and moved to the desired location with a joy stick.

In post-production on program or commercial material, the DFS really shines; for it can now electronically create a large range of effects that just a short time ago needed a film original and a week at the lab where the complex opticals were time consuming and costly.

Digital framestore synchronizers are here to stay, and as they become more versatile and more economical, they will spread to wider ranges of television operations in studios and production houses.

Acknowledgements

Information for this article was obtained from J. Brian Matley, Micro Consultants, Inc.; Robert Cobler, Grass Valley Group; and George Sekula, RCA. □

How did these broadcasters get ahead of the competition?

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KTVK 3 TV

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"...the election went like clockwork--I couldn't have asked for anything better. The Compositor display is clear and easy to read...you just glance at it and you've got it. We were ahead of the competition getting numbers on the air." —Tom Craven, KGW Production Manager

"We were well ahead of the competition election night... the reason, I feel, was in large measure due to the Compositor. It's easy to use, and prevents a great deal of possible error. Where the TM unit really shines is its computer interface with the character generator, which eliminates the extra step of manually entering the election results."
—Bill Gill, WOTV News Director

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PEOPLE IN THE NEWS

Lew Evenden, Director of Engineering for WPTV, Palm Beach, Florida, has retired after 20 years of service with the station. Lew was honored at a champagne-cocktail reception, attended by friends, family and staff, held in the studios. Honored guests included Donald L. Perris, President and Chief Executive Officer of Scripps-Howard Broadcasting Co.; Edward D. Cervenak, General Manager of WENS Television, Cleveland, Ohio; and Don Mercer, Vice President of Station Relations for NBC in New York. Perris presented Evenden with a silver plaque with a resolution of appreciation for his years of service with the company, signed by the board of directors.

Evenden was born, raised and educated in upstate New York. His hobby of radio became his life's work beginning in the 1930s when he became instrumental in the planning and installation of many radio stations on the east coast. With the advent of television, Evenden turned his interest to the video as well as the audio portion of the broadcast industry. He not only planned and built many television stations in the southwest United States, but in Cuba and Guatemala as well.

There have been many firsts at WPTV, and Evenden has played a vital part in all. It was Evenden who made it possible for WPTV to be the first station in Florida to place their master control room on a computer operation, not to mention the complete installation of a new transformer and facilities. In the early 1960s Evenden designed and supervised the building and operation of WPTV's first remote facilities using a microwave system. Evenden not only supervised the process of converting black and white television to color, but relocated complete studio facilities from Palm Beach to West Palm Beach in 1970.

William R. Gruenwald has been named Vice President, Marketing, for Harris RF Communications Division....**John A. Burtle** will be responsible for program automation product program as Broadcast Electronics' Director-Automation Products.

Andrew F. Inglis has been elected President of RCA American Communications, Inc., succeeding **Philip Schneider** who assumes the position of Executive Vice President, Operations and Engineering, for RCA Americom....**Neil R. Vander Dussen** has been promoted to Division Vice President and General Manager of RCA's Commercial Communications Systems Division....**J. Edgar Hill** is succeeding Vander Dussen as Division Vice President and General Manager of Broadcast Systems....**D. Gerald Smith** has been appointed RCA Broadcast Systems Sales Representatives for Nevada, Utah, southern Idaho, Oregon and northern California.

Leroy Wallace, a 30-year veteran in broadcasting, has been appointed Director of Television Products for CCA Electronics Corporation....**Howard L. Crispin** is promoted to Senior Vice President, Communications for Scientific-Atlanta.

Jay Luber has joined JVC Industries, Inc. as the District Manager for an area spanning Washington, D.C. to West Virginia....**Jerome W. Hull** has been elected to the Ampex Corporation's Board of Directors. He succeeds **Henry A. McMickling,** who has served on Ampex's board since 1948.

R. Dennis Fraser has been appointed Manager, Broadcast Equipment Division, NEC America, Inc.... **Philip N. James** has been named to the new position of Director of Administration and Planning of Deluxe General, Inc.

Lee Tate, newly appointed President of the Tape-Athon Corporation has announced a restructuring of the firm's operations, and the appointment of a new management team. The staff will include **Wally Rubin,** Executive Vice President and Director of the Sales/Marketing Division; **Joe E. Otis,** Director of the Audio Products Division; and **Robert Haller,** Director of the Operations Division.

Bruce R. Pollack has been appointed Sales Administrator of the Professional Products Department of Sharp Electronic Corporation....**Bob Moore and Jerry Bauer** have been appointed as Sales Representatives for Tandberg of America, Inc.

S. L. Thomas is the new Director of Marketing for SC Electronics, Inc....**George B. Honchar** has moved from Director of Special Projects to Vice-President at Imero Fiorentino Associates, Inc.

Dr. Wesley T. Hanson, Jr., a vice president of Eastman Kodak Company and Director of the Kodak Research Laboratories, has announced plans to retire June 1. He will be succeeded by **Dr. Leo (Jack) Thomas, Jr.,** currently an Assistant Director of the Research Laboratories. Dr. Hanson received his BS and MS degrees from the University of Georgia and his PhD degree in chemistry from the University of California.

Dr. Hanson has received many honors for his scientific research including the Distinguished Inventor Award by the Rochester Patent Law Association citing his invention of the color coupler masking system that made Kodacolor film possible. He received the Herbert T. Kalmus Gold Medal Award from the Society of Motion Picture and Tele-

Continued on page 52

SOCIETY OF BROADCAST ENGINEERS, INC.
P.O. Box 88123, Indianapolis, Indiana 46208

Glenn H. Lahman, Pittsburgh, and John M. Lyons, New York, received the highest honor conferred by the Society of Broadcast Engineers when they were named SBE Fellows at the Society's annual membership meeting, March 27, in Washington, D.C. This status is reserved for engineers who have rendered conspicuous and distinguished service to the Society. The election of Lahman and Lyons to this level brings the number of such Fellowships awarded to sixteen.

Lahman, engineering manager of KDKA/KDKA-TV, has just completed two consecutive terms as president of SBE. Lyons, facilities planning engineer for Riverside Broadcasting Corporation, is beginning his fourth year as a member of the Society's board of directors and has been instrumental in the success of three New York City SBE Regional Conventions. Both men have served significant terms as chairmen of their respective SBE Chapters.

Other broadcast engineers who have achieved Fellowship during the Society's 13-year history are: Glenn Boundy, Miami, Fla.; Albert Chismark, Fayetteville, N.Y.; Harold Ennes, Beech Grove, Ind.; Robert Flanders, Indianapolis, Ind.; Charles Hallinan, Binghamton, N.Y.; Harold Kassens, Washington, D.C.; Leo Reetz, New York, N.Y.; Joseph Risse, Scranton, Pa.; Orville Sather, Teaneck, N.J.; Lewis Wetzel, Casco, Me.; Martin Williams, Indianapolis, Ind.; John Wilner, Trenton, N.J.; Benjamin Wolfe, Baltimore, Md.; and James Wulliman, Milwaukee, Wisc.

Membership Response

The SBE ex-officio Executive Committee held a special meeting in February to find ways of more efficiently responding both to members and to potential members, particularly in the following areas:

People

Continued from page 51

vision Engineers in 1956, the Progress Medal Award in 1966, Honorary Masters of Photography Degree from the Professional Photographers of America in 1958, and the Progress Medal Award from the Photographic Society of America in 1976. He holds several patents and has written for numerous scientific and technical publications.

The Board of Directors of the National Cable Television Association has announced the results of elections for four officers who will lead the association during 1977-1978. Elected were: **Daniel Aaron,** Vice President and Co-founder of Comcast Corp., Bala-Cynwyd, Pennsylvania, Chairman; **Robert Hughes,** President of Communications Properties, Inc., Austin, Texas; **Edward M. Allen,** President of Western Communications, Inc., Walnut Creek, California, Secretary; and **John C. Malone,** President of TeleCommunications, Inc., Denver, Colorado, Treasurer.

- Applications for new membership
- Status of candidates for "grandfathered" certification
- Information about the certification examination program
- Chapter information
- General questions addressed to the Society's National office

The response to the Senior Broadcast Engineer "grandfathered" certification program has been so tremendous that the Indianapolis office has been literally inundated with applications. As a consequence, normal communication with the membership has suffered some unavoidable delays. Therefore, the ex-officio Committee has authorized an expansion of the Indianapolis office. We will not only add space, but we will also hire an additional person whose job it will be to handle membership and Chapter correspondence. In addition, we have approved the hiring of a third person who will be responsible for the paperwork resulting from the certification program, both in the "grandfathered" phase and in the soon-to-be-implemented examination phase.

The SBE National headquarters will continue to function under the direction of R. Michael (Vince) Flanders, assistant secretary-treasurer of the Society of Broadcast Engineers.

Qualifying Exams

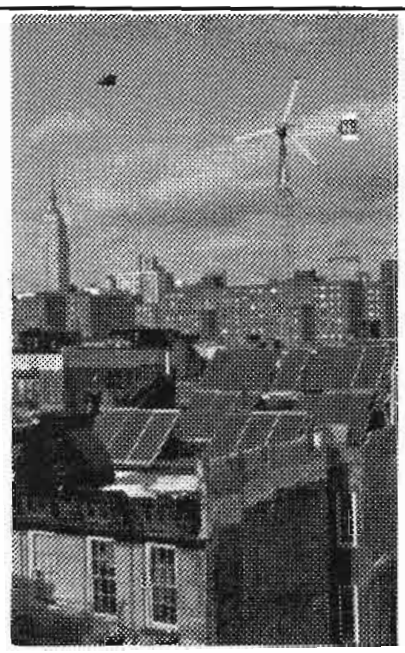
Preparation of the certification examination is nearly complete. Jim Wulliman is shooting for finalization by April 15, with the first nationwide qualifying exams to be given on or about June 15. SBE is working with the University of Wisconsin-Milwaukee to evaluate the testing procedure, rather than with the Educational Testing Service, Princeton, New Jersey, as reported earlier.

SCTE Relocates In D.C.

Effective April 1, 1977, the Society of Cable Television Engineers will relocate its national headquarters in Washington, D.C. under the direction of Judith Baer, SCTE's executive director. For the past several years, the Society has been headquartered in Ridgefield, Connecticut, with supplemental support from Baer in the metropolitan Washington area.

Robert Bilodeau, vice president of engineering at Suburban Cablevision and president of SCTE says, "With the Communications Act rewrite about to get underway, the new administration and changes forthcoming within the Federal Communications Commission, it makes sense that SCTE should establish itself in Washington." Founded in the late 1960's by a handful of CATV industry engineers and technical personnel, SCTE has grown to be the largest individual-membership organization in the cable television industry. "Our greatest period of growth has been within the past twenty-four months," Bilodeau continues, "but that's just a start toward realizing our goals and potential."

SCTE will staff its new offices with sufficient clerical support to service the Society's membership requirements. Beginning at the April 1 date, the Society's new address will be 1523 O Street NW, Washington, D.C. 20005. New telephone listings will be area code 202-332-3598 and 332-4466.



The New Yorkers Who Hustle the Wind

Street life in a metropolitan area often inspires genius. And that genius can be funneled two ways—good or bad.

The 11th Street Movement in Manhattan's Lower East Side has funneled their genius on the good side with a unique energy saving project involving windmills and solar panels.

This project is just part of the Emergency Energy Conservation Program operated by the Community Services Administration. CSA has established many demonstration programs designed to find new and better ways to help the poor and elderly cope with what for them is a continuing energy crisis.

The program has a broad base, covering everything from development of low cost solar heating and wind generators to experiments with energy conserving farming technologies.

But helping people help themselves isn't an easy task. Simply put, it demands community support—Your support and the support of local and state governments.

If you think this effort is worthwhile, take action; contact your local Community Action Agency or Community Services Administration Washington, D.C. 20506.

There are thousands of people who want to help themselves. Like the 11th Street Movement—they learned how to catch the wind, so they'll no longer be a victim of the elements.

COMMUNITY SERVICES ADMINISTRATION

Zoom In!

This is the official column of the American Society of TV Cameramen (ASTVC). The ASTVC can be contacted by writing to: P.O. Box 296, Sparkill, NY 10976. (914) 359-5985.

Take 1!...Paraphrasing Dagmar: "There's something I've got to get off my chest!"

Unidentified sources tell us that the Academy of TV Arts & Sciences is in trouble...Maybe one of the reasons (if we might venture a guess) is that one of the prime reasons for their original formation way back, has been forgotten... Then again, it may be that they have not completely forgotten their *raison d'etre,* but instead have found that trends within the industry have forced certain facts-of-TV-life upon them...

What we are saying is simply this: The **majority** of productions considered, and the **majority** of awards given, are **not** really from the TV area! When we say this, we automatically exclude those programs coming under the news & special events headings. However, the serials, police stories, situation comedies, etc....etc....are **not** produced by the nets, affiliates, or TV production houses...They do **not** employ electronic gear or personnel...In essence, they are the **"new"** form of Hollywood production made for the home screen rather than the theater...At the risk of retelling you what, I am sure, you already know it bears repeating that Hollywood never intended to lose its audience and market for very long...When the post-War introduction of TV did indeed change the entertainment style of Americans and did indeed cause the film industry some concern, big changes were undergone by all the major film studios...Someone at one of their Think-Tank sessions must have said, "Aha! If we can't zing it to them in the theater, C. B. (Editor's note: **not** Citizens Band) let's zing it to them at home." And that's exactly what happened...Over the years, more and more of the fare seen on TV came from the

Take 2!...While we're at it...

How many times have you professional engineering types out there heard someone watching some event on the tube remark: "I'd enjoy it a lot more if the damned cameraman didn't zoom in and out so much!" or "Why all the fancy footwork with the cameras...can't they hold a scene until I see what's happening?" or "All those effects are giving me a headache!"

When you next hear remarks similar to those above, could you please point out to this uninitiated friend of yours that within the ranks of control room personnel there happens to be someone called a **director**...This person is all-knowing, talented and gifted with the rare ability to sense what will send those hundreds of thousands of viewers "out there" into sheer ecstasy! Usually a pleasant, easy-going person...comes the witching hour (Air Time!) and our director now becomes a Svengali...mesmerizing the entire operating crew so that they become simply an extension of his creative self thereby lending their individual technical

Continued on page 57

filmmakers. Less and less came from NBC, CBS or ABC.

At first it was pretty good; you could always count on seeing some good movie that you might have missed. Movies (on TV) were getting better; so was the financial report in Hollywood.

But while the late late shows were featuring some awfully good movies made originally for the theater, the early evening programs were increasingly becoming mass-production film fare designed and produced for TV consumption. Well, now...what was the Academy to do?...Emmy awards can't just collect dust on the Academy's shelves...they have to be awarded... to someone...for something...The end result was that the Academy found itself in the unenviable position of vying with the Granddaddy of award givers...the Academy of Motion Picture Arts & Sciences. In effect, awards were going to performers, directors, technicians...and even the studios of an **alien** (though related) industry...Was this really representative of the TV industry... and its Arts & Sciences???

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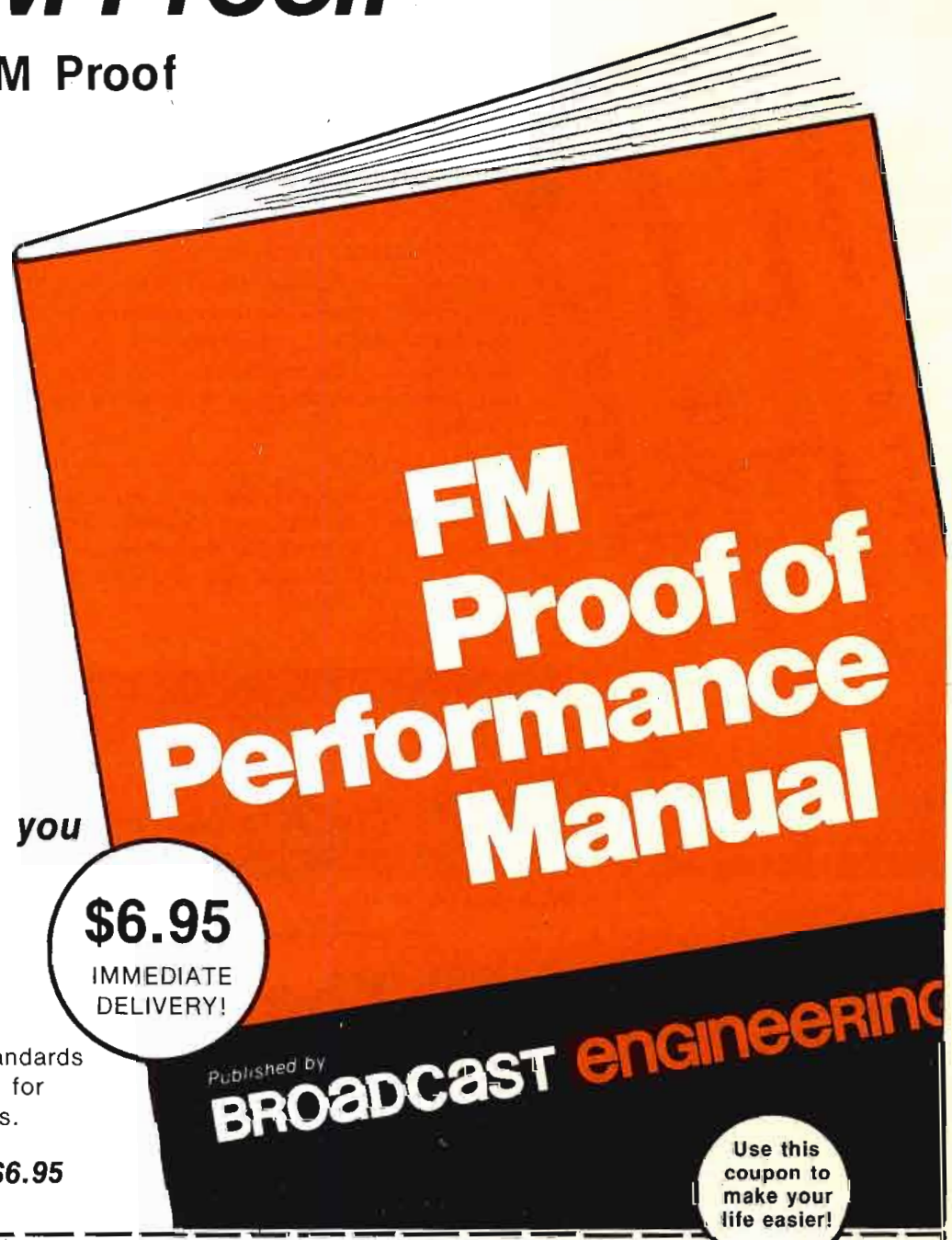

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Zoom In!

Continued from page 55

skills to his supreme effort of blending optics with electronics and producing (for the viewer) that headache your friend originally complained about...

Take 3!...Wait until next time... & Get it in!

Come our next column, we hope to be able to get it all in...all those fantastic photos taken at the NAB ...with Ron Merrell and all the boys ...Maybe there'll be some shots of the new gear manned by ASTVC personnel??? Better look for the next issue...and if you are not now getting your **BE** mailed to you, ask us for the **BE** subscription coupon. All ASTVC members should have been sent one in the mail.

Our newsletter editor, Lois Filippi, tells us that she would like all you guys out there to write to her...we don't know just why, but we suspect that she would like to get to know you for professional reasons. (???) How about it guys... tell her about yourselves and send some photos of you and your camera or editor or switcher...

Till next time...

Fade To Black...

NEW PRODUCTS

Miniature Broadband Step Attenuator

Narda Microwave has developed a new custom engineered broadband miniature OEM step attenuator which operates over the entire DC to 18 GHz frequency range in 1 dB steps to 69 dB. This miniature step attenuator features field replaceable attenuator capsules that will eliminate long downtime.

It is designed for use in high reliability 50Ω systems and applications where space and weight are at a premium. This attenuator uses the unique Narda detent which assures resetability to better than 0.05 dB to 18 GHz. It has been designed to be mounted through the front panel and can employ any standard connector configuration. This miniature step attenuator is only one sample of the custom engineered attenuators designed by Narda to meet specific customer requirements.

Audio Switching Module

Modular Audio Products New Model 4011 FET Audio Switching Module provides four fully independent, remote-controllable audio switch circuits on a compact, plug-in PC card, with gold plated edge.contacts.

Ideal for use in high quality professional audio applications, Model 4011 may be utilized individually, to perform various switching functions in console mixing channels; or in multiples, to form large or small Matrix type switching/routing systems.

Designed for optimum performance in 600 ohm balanced or unbalanced circuits, Model 4011 features: High Speed -2 microseconds from On to full Off state (-100 dB at 1 kHz, + 4 dBm input Nom.). Low Distortion - 0.07 percent at + 4 dBm output, 1 kHz; and High Input Level capability - +22 dBv Max. Frequency response of the unit is extremely flat from DC to 20 kHz (-0.1 dB Max). Power requirements: ±15VDC at 10 mA Max.

per card. Dimensions: 2-¾ inches high x 4½ inches long x 13/16 inches wide.

This latest addition to the well known MAP IMPAC Series of "Integrated Modular Professional Audio Components," is a part of a total modular system concept, employing various plug-in modules, standard 19 inches W. x 3½ inches H. Rack Mounting Card Frames and Modular power supplies. MAP IMPAC offers a high degree of flexibility in the design of Modular audio systems, now featuring the option of self-contained or remote controlled operation.

For More Details Circle (71) on Reply Card

Broadcast Encoder

Sansui has introduced a professional QS 4-channel broadcast encoder. It uses 2-channel media to store and transmit all information necessary for 4-channel playback.

While it is totally compatible with all existing 4-channel matrix playback equipment, the recent QS decoders with the QS vario-matrix ICs offer interchannel separation of more than 20 dB without introducing any side effects which are common to the gain controlled enhancement devices.

The power requirements are voltage: 115v 60 Hz, and consumption: 20 W rated. Dimensions are 19 inches x 3½ inches x 12¾ inches. The net weight is 6.23 kg.

For More Details Circle (72) on Reply Card

DC Drum Servo Kit

A direct drive DC Drum Servo update kit for Sony VO-2850/2850 A videocassette machines has been announced by **Video Associates Laboratories** in time for spring deliveries. The unit replaces the conventional drum drive belt and DC brake assembly with a high torque DC motor. Servo circuit changes include the addition of a unique single adjustment speed discriminator circuit, an additional power supply, and a motor power amplifier.

When installed on the record side of an editing system, the unit will track out incoming variations without any belt slippage. Overall time base error is improved to the point that a ± one line window time base corrector is adequate. All effects of

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New Products

Continued from page 59

power frequency deviations and transients are eliminated.

Since initial motor installation is critical and Video Associates Laboratories cannot supply exact information for each machine's unique requirements, you may choose to have Video Associates Laboratories install the kit for you. If you prefer to do the work yourself, an installation and maintenance training video tape cassette is available from Video Associates Laboratories.

For More Details Circle (73) on Reply Card

VTR Controller

The new 4220 frame accurate edit code comparator from **BTX Corporation** compares any preset SMPTE time code with any parallel decoded SMPTE data off tape and provides a command signal to start or stop VTRs and audio recorders, and activates an LED signal light when the dialed-in tape location is reached.

The 4220 comparator operates in both play and rapid shuttle modes, and in both forward and reverse tape motion.

Typical applicaitons include controlling VTRs and audio recorders using SMPTE time code for accurate frame by frame editing, and upgrading existing tone editing systems for SMPTE time code compatibility.

The 4220 is packaged in a rugged metal case the size of a transistor radio and is designed to survive the rigors of everyday continuous use in the tape room or production studio. It is fully compatible with all SMPTE time code editing equipment.

For More Details Circle (74) on Reply Card

Squeezoom®

Vital Industries' Squeezoom® is an electronic system that will lock up to four non-synchronous, foreign, remote, or in-house color video pictures and display them simultaneously on the screen maintaining the full raster picture content of every signal. The Squeezoom will squeeze a full picture to any size and any position on the screen. It will freeze one full resolution frame of color video, and it will zoom any segment of a picture

to a full screen. It will also have multiple horizontal and vertical patterns of compressions giving the video industry new vistas of picture control only possible before with lengthy film optical techniques.

For More Details Circle (75) on Reply Card

Production Switcher

A studio production switcher with built-in microprocessor to provide event memory and simplified operation was introduced by **3M Company's Mincom Division** at the National Association of Broadcasters convention.

The 3M Model 516 video production switcher with microprocessor control is a departure from traditional switcher design and features the ability to "remember" up to four programmed events for recall during production. Further, because of its microprocessor, switcher operation and reliability are improved.

More than 20 effects are selected by a 10-key input bank; additional patterns may be incorporated in the future.

For More Details Circle (76) on Reply Card

advertisers' index

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TRAINING (CONT.)

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WANTED: Pre-1926 radio equipment and tubes. August J. Link, Surcom Associates, 305 Wisconsin Ave., Oceanside, Ca. 92054, (714) 722-6162. 3-76-tf

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WANTED: 21E/M Collins transmitter. Call collect 2636/7 or Telex 339 Caradio LC to Foster Radio Caribbean, P.O. Box 121, St. Lucia, West Indies. 4-77-2t

WANTED: Thermostat TH-503, 60 Degrees C for General Radio 1181-A Frequency Monitor. Call 615-523-3171 or write WNOX Radio, Knoxville, Tenn. 37917. 4-77-1t

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WANTED for campus AM radio station production studio training program: one 8 fader audio console; 2 turntables, tone arms and cartridges; one recording cartridge tape machine; one reel-to-reel tape recorder. All monaural. Small college. Tax write-off donation. Brad Gromelski, Chairman of Radio/TV, Elizabeth Seton College, 1061 North Broadway, Yonkers, N.Y. 914-969-4000. 4-77-1t

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DOLBY LABS MODEL 334 unit (five months old), RCA BTS-1B stereo generator (20 months old), 2 Marti CLA-40 Compressor/limiters. All in excellent condition. WEOS-FM, Geneva, N.Y. 14456. 315-781-0155. 4-77-1t

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TWO AMPEX 1200B VTR with Colortec, Velcomp, One-2 Speed E.E., One 3M DOC, Three Spare Videoheads—Asking $99K or Best Offer. Four RCA TR-3 Low Band Color. Best offer. Call (516) 538-8700. 4-77-1t

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