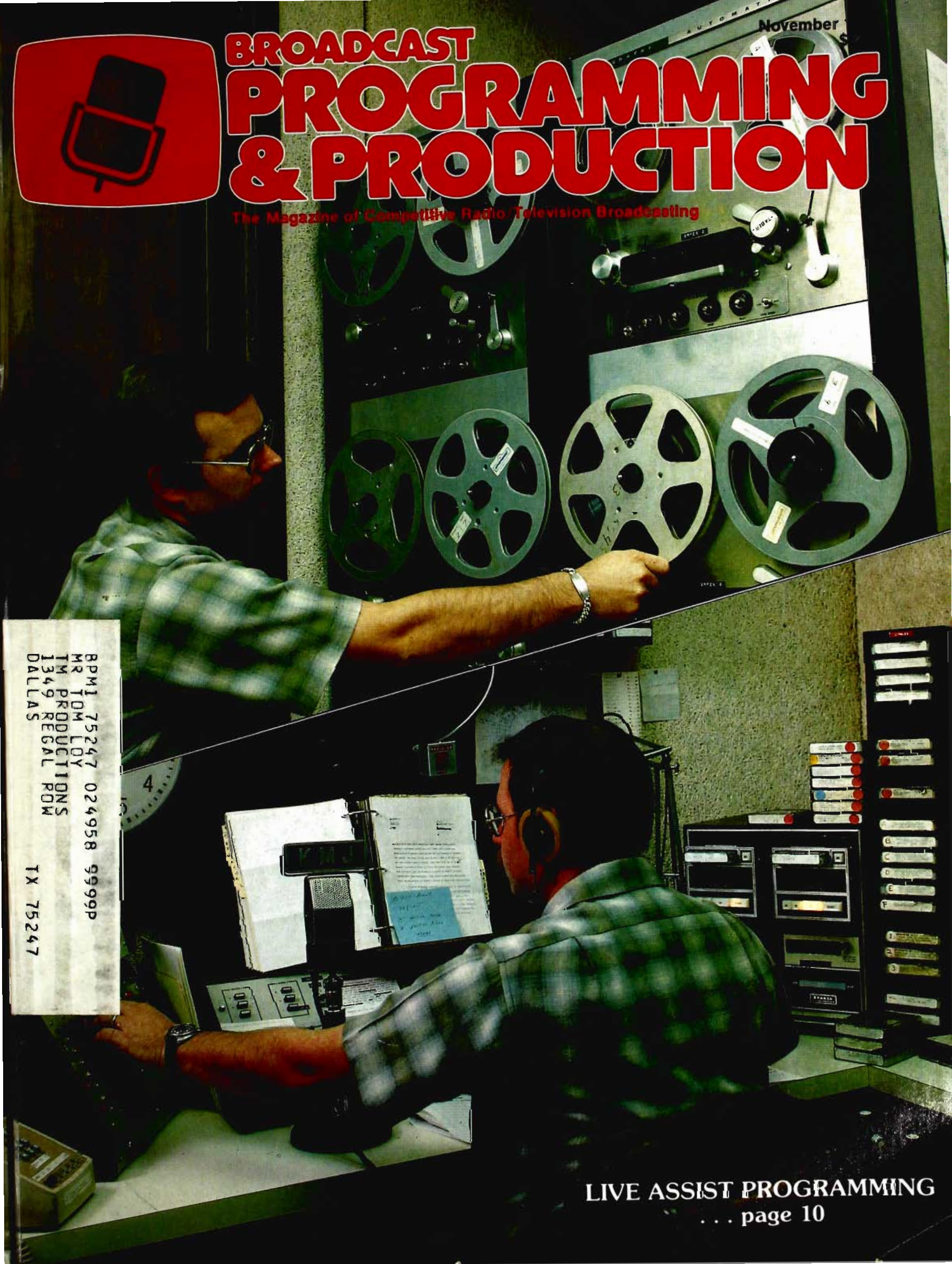




BROADCAST PROGRAMMING & PRODUCTION

The Magazine of Competitive Radio/Television Broadcasting

November



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LIVE ASSIST PROGRAMMING
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The Washington Connection

by
Clarence McKee



WILL "WESH" WASH

"We hold that the Commission acted unreasonably and without substantial support . . . and we remand for further proceedings."

With these words, a panel of the U. S. Court of Appeals in Washington, D. C., remanded to the FCC the renewal of license of Cowles Broadcasting's WESH-TV, in Daytona Beach, Florida. In doing so, the court threw into disarray the FCC's policy (or lack thereof) on comparative renewals and its "substantial service" standard for making determinations.

The court called the Commission's practice in comparative renewal proceedings "unsatisfactory". It stated that the Commission failed to set forth a reasoned basis and rationale for its decision in favor of the incumbent Cowles and thereby denied the challenger a full comparative hearing as required by law.

Needless to say, the WESH decision has set the industry on fire and the FCC scurrying to defend itself and its wisdom. Once again the FCC has been caught with its regulatory "pants down". The industry once more finds itself on the defensive in what really amounts to a life and death struggle — especially for multiple owners — to insulate licensees from renewal challenges.

The Commission had attempted to assure renewal applicants a "renewal expectancy" and thereby allow them to feel protected at renewal time if they had provided "substantial service". The court rejected the substantial service theory stating: If the Commission believes that "substantial service" will justify renewal more-or-less without regard to comparative issues, or that such performance is entitled to a plus of major significance, it is plainly mistaken. Judge Wilkey then stated that superior or above average past performance is highly relevant to a comparison.

Of major concern to multiple owners is the court's criticisms of the FCC's treatment of the diversification criterion in comparative cases:

The 1965 Policy Statement did say that related media interests within the service area were usually more important than more distant interests. It did not nearly say that interests outside the service area were unimportant. In fact, the fairer inference, and the one more consistent with other Commission policy, is that related media interests anywhere in the nation are quite material (emphasis added).

The court has directed the FCC to reconsider its conclusions in light of the conceded relevance of diversification of media ownership in the comparative renewal context and the materiality of related media interests anywhere in the nation.

Broadcasters

The petition-to-deny craze of a few years ago has received new fuel with WESH as the kindling. Any multiple owner would be fair game to challenges from groups claiming that a denial of the renewal and a grant to them would promote diversification of media ownership. Minorities, especially with the diversity concept being one of the basis for the Commission's minority ownership policies, would have increased incentive and opportunity to challenge such renewals and should be overjoyed with the court's decision.

Instead of running to build barricades, broadcasters should take the initiative and seek firm, definite, clear comparative renewal standards and criteria from the FCC as had been suggested already by Commissioners Brown and Fogarty in their advocacy of a Commission inquiry into the matter. In the course of seeking such a clarification and definitive statement, broadcasters might have to "lose the battle" in order to "win the war". Specifically, broadcasters might have to concede on the issue of establishment of quantitative standards/percentage guidelines for determining

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and there's no one there . . .*
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The Cover:

Live-assist programming in action at station KMJ, Fresno, California, with air personality Alan Richmond operating the console and tape machines.



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station meeting minutes

by

Howard W. Coleman



AN IMAGE OUT OF FOCUS

"Our stations have the blahs," WAAZ general manager Ray Ames said to his program director, "and I'm not sure I know how to explain what I mean, let alone do anything about it. Ratings okay, income on budget — but I feel that we are a remote voice in the community."

"Maybe we should send for the 'Station Doctor,'" the PD replied. "I clipped a business article the other day — let me read some of it for you."

Bret Johnston identifies himself as a new and different breed of cat: not a program doctor who implants a canned format, or fresh sets and uniforms for the news crew, or a curvy weather girl full of 36-24-36 isothers to juice up the show. Johnston represents himself rather as a *station doctor* — looking at all parts of the local radio and/or station operation and image. On-the-air appearance and sound of course, but a number of other things as well — items that local management may be too close to for objective evaluation.

"That man may just have a point," Ames said. "Let me look at that piece of paper. Um, it says that he feels he does his best work in small-to-medium markets. With 100,000 population, we fall right in there. Works on a fee-plus-cost-per-diem arrangement. And I like this: 'Johnston wastes no time. But in his pattern of doctoring is the guarantee that he spends his first 10 days anonymous to station personnel, moving around in the community — *then* makes his report to management.'

"Joe, thanks for being a thorough reader. I think I'll contact this guy and see if we can afford him."

Ames met Johnston in another city, read several of his reports, and signed a contract for a survey of the WAAZ stations and Midville. In several visits to the stations Johnston was introduced as a friend of Ames with an investor's interest in broadcast operations.

A few weeks later he filed his report . . .

THE JOHNSTON REPORT — WAAZ-TV, WAAZ-AM, Midville

In general:

You are in a satisfactory position from a financial viewpoint. As one of three competitive TV affiliates in the market you have a good share of the local and national spot business. Your radio operation has a kind of heartland of America, middle-of-the-road sound that is quite adequate and in balance with your competition. Technical personnel seem qualified; physical plant is good.

Now some specifics:

- Two years ago, in response to FCC community ascertainment sentiments, you employed a professor and research team from the local college to conduct a survey. The results were, as is often the case, inconclusive: the PTA doesn't like your children's programming; classical music devotees want more of the same; opera buffs would like a musical menu from Victor Herbert to Wagner — and local sports fans are adamant in stating that you should preempt NCAA and NFL games to carry the Midville high school schedule.

But what *did* you do? I find little evidence of attempts to serve the community, either short haul or long range. The Midville public parks have a shabby, not-well-pruned look — not dirty or rundown, just not very inviting. The municipal parks commission hasn't met in six months. What can you do about it?

Again, there is a half-mile of dangerously-rotting piling along the river front, unsightly as well as dangerous. The area is titled to a now-defunct freight railroad. What can you do both to remove the danger to youngsters and to improve the city's appearance?

continued

The Washington Connection

service as has been suggested by Henry Geller of the National Telecommunications and Information Agency (NTIA).

The FCC

The FCC should immediately proceed along the lines advocated by Commissioners Brown and Fogarty to institute a rulemaking and develop a policy statement on the entire matter of comparative renewals. For too long the Commission has tried to be "all things to all people" in this area and, as often happens to those who walk slippery tightropes, has fallen on its face. The Commission should formulate clear and objective criteria — no matter how difficult the task may be — for determining what type and level of performance will entitle an incumbent licensee to a legitimate expectation of renewal which will pass judicial muster.

A Word Of Caution

In developing criteria for the comparative renewal area, the FCC must be very careful in its handling of the diversification issue. If, as the NTIA suggests, the Commission adopts a "meritorious service" criteria and eliminates diversification as a criterion, it would be in for a greater fight and controversy than now exists. Any attempt to substantially diminish or eliminate diversification as a comparative element would bring outcries, anger, and severe opposition from citizens groups and minorities. Hence, in attempting to clean up the present mess, the Commission, if it adopted the NTIA view of eliminating diversity, could create even more chaos in this area. Diversity is a key aspect of the public interest standard and public interest groups and minorities would create just as loud an uproar over its being diminished as is the industry over the WESH case itself.

Will "WESH" wash? The industry thinks and hopes not. The FCC is not sure. The industry, the public, the courts, and the Congress can all turn to the FCC and say:

This is a fine kettle of fish you've gotten us into.

— Laurel v. Hardy



from: **David M. Sites**
Engineering Operations
WOKV/WCIN
Cincinnati, OH

In response to the September 1978 article by John Price, I can only say . . . Finally!

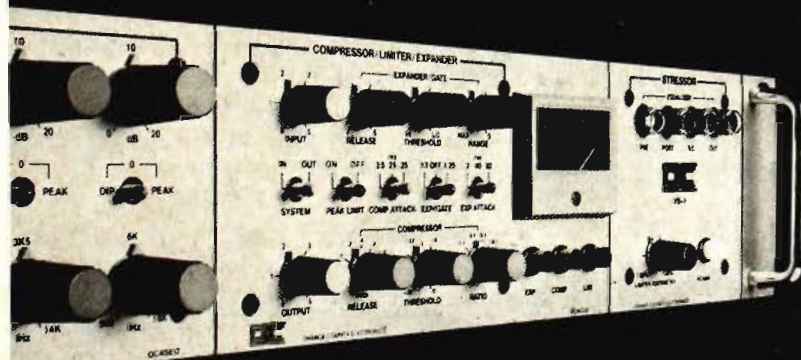
I've been looking for something in print that could help convince programming folks that being "the loudest signal on the band" is not the answer to the ratings race.

In the Cincinnati area, we are blessed with over 30 other radio stations as competition, and it's rough to stay on top, or even get there. Most of the folks in the programming end of radio say that the louder the signal, the better the ratings. Now, I've been involved in both AM and FM since 1966, and I've yet to see a listener punch back and forth between stations in Cincinnati and choose his favorite radio station simply because it is the loudest.

Sure, loudness can make the crucial difference in the fringe areas of signal coverage, but in the fringes of our coverage at WOKV, which is an

— continued on page 7

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More Letters . . .

FM, the rating service stops surveying the listeners far short of the fringe.

Under the direction of Kurt Farmer, the chief engineer for WOKV, various equalizers and compression devices have been eliminated from the audio chain of the station, and with the removal of each device the sound of the station got cleaner and cleaner. The philosophy at WOKV has been one of quality sound on the air. A lot of money has been spent by management for top quality audio gear to get a good clean sound. The gear is mostly broadcast-type equipment such as turntables, cart machines, and the like. But things like the type of cartridge/stylus combination can make a great deal of difference where the sound of the music we play (which is contemporary) is concerned.

After all, listeners in Cincinnati are now getting a bundle of money on top-notch audio systems, and we'd like to make sure that WOKV is the station that Cincinnati turns to.

from: **Randy Wells**
North Coast Communications
Santa Rosa, CA

I enjoyed the article by John Price, "Gold Plating A Tin Ear". It is my opinion that the listener is already very conscious of broadcast audio. Let's keep our transmission standards a couple of jumps ahead of the fine quality that is already available in consumer audio gear.

Station Meeting Minutes . . .

The civic auditorium is a solid building with many years in it — but it shows its age and the scars of a lot of use. Sand-blasted and partly remodeled, it could say a lot and do a lot more for Midville!

• In a similar community vein, I examined all of the rosters, yearbooks and mastheads I could locate of the Midville civic, fraternal, religious and similar organized groups. I did not find the name of a single WAAZ executive or staff member on any of them! There are members, of course, but I was looking for leadership. I don't believe in ordering everybody out to be a joiner — but I also believe that when a business takes from a community it has an obligation to put something back.

• The stations' vans and wagons are beautiful, always clean; the painting and distinctive design shows thought and expense. *Why then* do you have drivers who are too often imperious on the streets, cut people off, park in no-parking zones — with that expensive logo on all sides to show who did it?

• The news crews are supplied with crisp and distinctive slacks and blazers, color coordinated, big numerals on the handkerchief pockets. That's *on-the-air*. *Why*, when they appear around town after their shows, do they look so sloopy, ties pulled open, or off, jackets hanging limp — the exact opposite of their carefully-styled on-air appearance?

• Even recognizing that mobile technical equipment takes a lot of bumps and abuse, I must ask why you don't pay the same attention to the appearance of radio and TV gear that you do to the station wagons? Scraped paint, dents, bruised logos and call letters, a tripod held together with black tape, do not speak well for the stations at a governor's conference or Rotary luncheon.

Some thoughts for Ray Ames . . .

Bret Johnston promised nothing in the way of improved ratings or profits in his contract — the reason why he calls himself a *station doctor* rather than a program doctor.

He did on the other hand make suggestions that would *add* cost and personnel load to the existing radio and TV operations. Not significant cost, but some. And, depending on size and capabilities of the present staff, the possible addition of a community affairs director and even a department.

The Johnston Report's implied suggestions to Ames and staff are self-evident. Tightening a tie and buttoning a coat is easy; re-training or hiring new drivers isn't a major problem. Putting something better than Band-Aids on bruised equipment is an improved engineering maintenance function.

But the assumption of leadership in civic affairs demands time, effort, skill. The best promise is probably in the thought that, if the WAAZ stations are demonstrating leadership in large-scale community improvements and functions, they will be much less vulnerable to small-scale attack!

from: **Jack Rollings**
Station Manager
KMAS Radio
Shelton, WA

Mr. Coleman . . . Just read your column in *BP&P* — "Can You Wing It On A Prayer?". I'm sure your mail will increase as readers pass this article along to Oral Roberts, Jerry Falwell, and Rex Humbard.

Probably you're not interested in my opinion . . . but since it's free . . . I pass it along.

Before you write such a biased piece again, why not meet and personally view the ministries of Roberts, Falwell, Humbard and others. You might be amazed to learn that a great majority of so-called "church" people don't care a bit what the national or local Councils of Churches think.

We're country music . . . not a religious station. The views expressed are mine. I started in this business in 1946 — so I'm not a novice.

For what it's worth . . .

I am, of course, interested in Jack Rollings' response; by coincidence my Broadcast Pioneers plaque gives me 1946 as my first year in the industry, so we have equal rights!

Bias? I am a member of the board of managers of the Communication Commission of the National Council of Churches, and also a member of National Religious Broadcasters. I am well aware of what is happening in the overall field of religious broadcasting. My bias, to which I most freely admit in my role as a columnist for

BP&P, is based on that background.

Funny coincidence: The same day that I received Jack Rollings' letter I had a phone call from a station manager in West Virginia. "You must have a wire tap in my office," he said. "I've just taken over this station, and found it infested with paid religion. I reduced it to hours where it wouldn't hurt our ratings and our commercial ability to sell — with great furor and much pressure. Many thanks — you gave me strength."

One cautionary note: When Rollings states that his audience doesn't care what the local Councils of Churches thinks, he might be asking for the trouble I suggested in my column!

Howard W. Coleman
Station Meeting Minutes

from: **Addie M. Rimmer**
Research Coordinator
The National News Council
New York, NY

We would like to commend you on the sound advice you offered broadcast journalists in your article, "Who Shall Guard The Guardians?" (*BP&P*, September 1978).

Whereas factual errors can be attributed to human flaws, charges of imbalance are usually assumed to result from a deliberate effort to distort and denigrate. As you accurately state, "It is a growing lack of balance that is generating increasing antipathy toward journalists."

There is, however, one point in your article we found disturbing. In writing of our grievance procedure and that of the FCC you state, ". . . both processes are slow, burdensome and expensive . . ." It is true that extensive research investigations and the schedule of Council meetings do not always permit speedy resolutions of complaints. But it costs nothing but the time it takes to write the complaint and the postage required to forward it. The costs of the investigation are absorbed by us.

We hope you will pass this vital information on to your readers.

In "Who Shall Guard The Guardians", I criticized the use of generalization in news reporting. In the case of the National News Council, I plead guilty to the charge of generalizing about the cost of taking a complaint to the Council. Taking a fairness complaint to the FCC is expensive by virtue of the necessity of having an attorney lead one through their bureaucracy. It was my impression the Council operated the same kind of obstacle course. In this case, my impression was caused by a lack of information.

In 15 years in the news business, I have never seen a brochure, heard a public service announcement or had any other kind of information about the Council other than word of mouth. Remedying that anonymity would go far in resolving the conflict between an honorable profession and lousy practitioners. I will be pleased to volunteer my services in promoting a greater public knowledge of the Council's functions and availability.

— Mark Bragg

from: **Bud Thomas**
KDKB Radio
Mesa, AZ

My compliments on a fine publication. I have found the articles on automation and production techniques to be very informative. I am sure that radio sounds better at every station that receives *BP&P*.

*When you hear voices
and there's no one there . . .*

live assist:

THE MIDDLE GROUND IN RADIO AUTOMATION

by Bill Lobb

Perhaps Bob Dylan said it best: "The times — they are a changing."

Today in radio, even something as simple as a phone call to one's "local" dee-jay can be expensive and surprising . . .

At 6:21:30 this morning in Hominy Grits, Arkansas, while the radio audience listened to the 'live' promo regarding the Garden Club's Tea Social, the announcer, in actuality, was sleeping peacefully in his hillside pad atop the Sunset Strip in Hollywood. Such is a growing popularity in radio . . . The Designated Voice.

Temperatures, time checks, seasonal greetings, personality voice tracking, and myriad of other live-assists aids are more and more finding their way into studio control rooms and blanketing local communities with information, education and wit.

The outcome not only makes life a little easier for station managers, but in many cases adds a professional quality to certain small markets where a big problem might be



For its approach to "live assist", KTLC in Twin Falls, Idaho, uses supplied library reels on Revox A77 machines equipped with 25 Hz tones, and carts the current and re-current reels. Under the tape decks are programming wheels to aid personalities like Roger Curtis in executing the format properly.

Author Bill Lobb is public relations director for Radlo Arts, Inc., a major programming syndication firm headquartered in Burbank, California. Prior to this he was the director of advertising and promotion at KFI Radio in Los Angeles, and was formerly the assistant to the vice president in charge of advertising and promotion at Golden West Broadcasters. Other communication stints include: RKO General Radio, Los Angeles Herald-Examiner, Billy Jack Productions, and copywriter for an advertising agency. His first broadcast position was as an announcer for Armed Forces Radio and TV in Europe while in the service.

the part-time dee-jay whose voice is changing (not to mention the constant fear that one day his Adam's apple might permanently lodge beneath his collarbone).

Regardless of market size, a big plus is the freedom live-assist provides station personnel to concentrate on areas that require more attention than they are normally able to provide.

Today's station might be totally automated, semi-automated, or both . . . but one thing is certain; more voices are being heard on tape across the airways than ever before.

Taking The Middle Ground

There has been much written about the status of automation in radio, but this article

is geared to the broadcaster who is looking to bridge the gap between totally live and automated. There are numerous reasons why station managers find this situation ideal for their needs, ranging from reducing costs of non-peak hours to freeing time for increased production and spec-spot creation.

The promise of live-assist programming has arrived, and more and more stations — both AM's and FM's — are perking up their air sound through the utilization of this improved engineering technology.

What are the determining factors in making the move to live-assist? Larry Vanderveen, president of Radio Arts, Inc., a major music programming syndication

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New Jersey Station

Another station with a deep community involvement which relies on live-assist is WIIN, Atlantic City, New Jersey. WIIN is the only CBS affiliate in the state of New Jersey and the station features the syndicated adult contemporary format, Sound 10. Allan Segal is the program director and also an air personality.

WIIN blocks morning and evening drive time with news and information (6:00 - 9:00 a.m. and 5:00 - 6:30 p.m.). Air personalities perform the rest of the 24-hour broadcast day. Total on-air personnel numbers eight. Sports play a big role on WIIN and, in addition to carrying the Philadelphia Phillies baseball games, the station has beefed up its football coverage to include all NFL playoff games.

Sound 10's music is programmed on tape machines connected to a Shure five channel mixer. The system has been modified so that each channel will take a high level input, and small micro-buttons have been placed above each of the pots. This acts as a sub-mixer into the main board. Engineers rotate the tape machines, keeping two down and the remainder live to stretch the lives of the machines. SMC tone sensors are used on all the machines.

In addition to a full commercial load, enormous amounts of public service spots — between 500 and 600 a week — are aired.

WIIN is a dominant influence in the sizeable New Jersey market. The station is well received by its audience and its success, in part, is due to live-assist programming.

System Design

Stations all across the country find a definite advantage to live-assist for a variety of reasons. Each will use it in their own way and perhaps no two stations use live-assist in an identical manner.

There are many commercial products available to aid the broadcaster with execution of a live-assist format. These

systems range in price from several hundred dollars to several thousand, depending on the degree of in-built computer technology. However, it is possible to set up a basic sequencer at little expense which should prove to be highly effective in most situations.

As an example, the following is a hypothetical programming situation showing how a station that uses live-assist might function.

The system is intended to give the station additional operating flexibility when personnel is at a minimum. It may be used to 'automate' periods of from twenty to twenty-five minutes without attention, depending upon the actual configuration used at your station. Its primary intent is to allow the announcer on duty to attend to production or other chores.

Equipment Requirements

You will need three reel-to-reel tape playback units with 25 Hz sensors. Some models are available with internal sensors, others require external units.

A single cartridge playback unit is needed, however a triple play unit or a comparable number of single-cartridge playbacks would be helpful. Each deck must be equipped with both a primary (1 kHz) stop tone sensor, and a secondary (150 Hz, sometimes called "Aux") tone sensor. Additionally, your cartridge recorder must be capable of recording both tones on the cue track of cartridges used in the system.

Finally, you will need to build a sequencer which contains two rotary switches per program source. (Please see diagram.)

Switch #1 determines from which source a start command originates, and Switch #2 assigns a new start command to the next source in sequence.

Basic Circuit Description

This system sequence begins when Tape Deck 1 (TD 1) is manually started. (Note position of Switch 1 on TD 1). The first song

plays. The 25 Hz tone at the end of this song closes a relay in its sensor which acts as a start command for TD 2. This is made possible by routing the signal through Switch 2 of TD 1 and Switch 1 of TD 2. The selection on TD 2 plays and upon its completion the 25 Hz tone activates the start command through Switch 2 of TD 2 on to Switch 1 of TD 3, thereby beginning the third selection in this sequence. A spot break is our next event, so at the end of selection three, a command is sent through Switch 2 of TD 3 to the cartridge deck (CD) Switch 1. After this spot(s) plays the system returns manual control to the operator. (Note Switch 2 on CD.)

This sequence is only provided as an example. A number of combinations are possible with this type of system. For example, after the completion of the spot, a start command may be sent through CD's Switch 2 to TD's Switch 1, providing an endless chain of events.

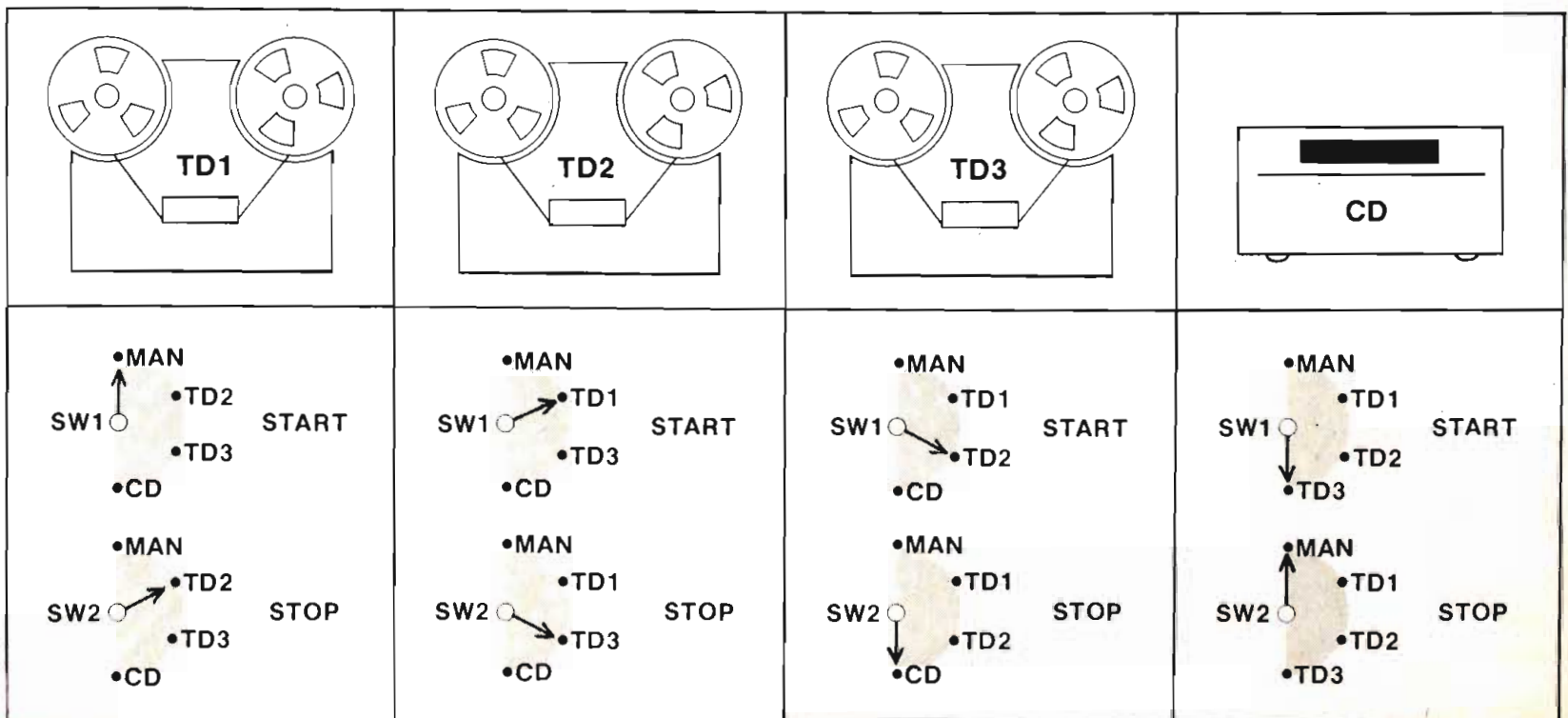
Operating Notes

In everyday operation, this make-believe system would be used to "automate" short periods during the day, or to provide walk-away time while the announcer on duty prepares news, produces spots or accomplishes some other short task. Obviously, such an operation will have very little live content, nor will the system be able to join a network on time.

If your decision is to try such a system, be sure that it is capable of functioning well during full-live periods of operation. This will mean defeat switches (or a master defeat switch) to break the chain of control lines when manual control is to be resumed.

Should you decide to upgrade to full automation, the reel-to-reel and cart machines may be easily incorporated into the system. Only the sequencer will be rendered obsolete.

Your own live-assist system could provide efficiency, control and the quality of automation without losing the appeal of the



company, gave this answer:

"Automation is an excellent tool, but not for every station," he said. "Broadcasters must study their own situations before deciding if live, live-assist or automation best suits their facilities and markets. The live stations we program come to us, in part, for music control and consistency and are as important to us as our automated station clients. To this end we applaud the equipment manufacturers for recognizing the needs of both automated and non-automated stations."

One of the major advantages live-assist offers the broadcaster is the ability to experience the use of pre-programmed music without investing heavily in new equipment. In such a situation, the programming service company's library is aired from several reel-to-reel decks which may be playback-only units with inbuilt 25 Hz sensors. This provides the convenience of automatic cuing after each selection has finished.

Current selections may run from an additional deck, or be dubbed to cartridge and played back in existing cart units.

Recent advances in cartridge design, combined with a significant reduction of stereo phasing problems has eradicated the tell-tale signs of many carted-music stations of the 60's.

Best of all, machines used for live-assist programming may serve an additional duty as source equipment for an automation system during non-peak dayparts. Also, decks purchased today for live use may be built into tomorrow's automation system.

Case Histories

A prime example of a station successfully utilizing the elements of live assist is WXLW, Indianapolis, Indiana. WXLW is a full-service CBS affiliate programming a contracted adult MOR music format, The Entertainers. The station also carries network news and sports, traffic and market reports.

CBS News is carried on the hour followed by local news and sports. Every half-hour WXLW airs a calendar of events, both local and statewide.

According to general manager Stan Barrett, the response to the programming from the audience has been very gratifying. WXLW's strong execution and substantial revenue gains are a testimony to the effectiveness of live-assist radio.

Full music service on tape, professional music selections, categorization and song-by-song sequencing are provided by the major programming syndication services. Mechanical gremlins associated with records such as scratches, off-center pressings, pops, clicks and warped copies end up on the programmers' production room floor . . . and not on the air. The finished product delivered to the station is a quality tape in ready-to-play form.

Live Assist In Idaho

Dick Ryall is general manager of KTLC, Twin Falls, Idaho, and programs the

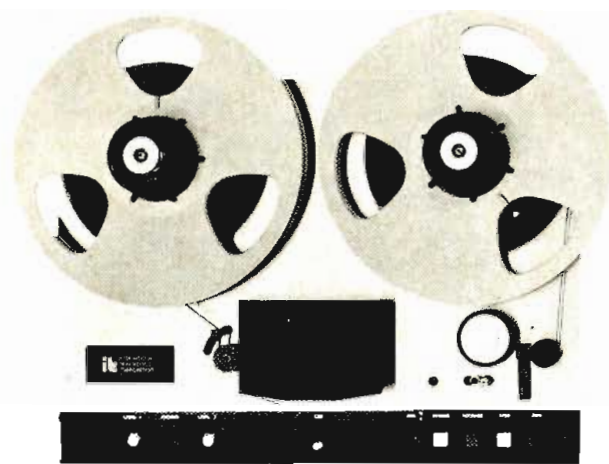
syndicated Bright 'n Easy Country format. The station is run totally live 24 hours a day. Two tape machines provide the equipment to run the format, and a cart machine supplements with selections of the Top 100. Tone sensors automatically cue the selection of the tape decks. NBC and local news are presented on the hour and special programming features such as Earl Nightingale's "Our Changing World", "The Ralph Emery Show", and Evan Slack's "Farm Report" help round out a typical broadcast day.

Ryall takes his responsibility to the

community seriously and keeps listeners apprised on matters relating to agribusiness, local club meetings, stock reports and school lunch menus. A public affairs program titled, "Midday", airs daily from a local finance institution which is also the show's sponsor.

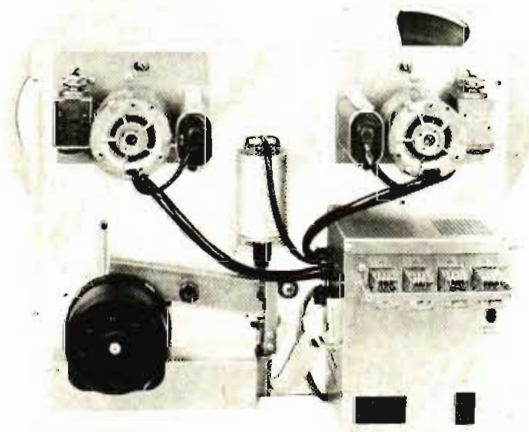
Operating 24 hours a day live, KTLC is an example of how far reel-to-reel deck handling capabilities have come. The historical drawbacks — including tape stretching, poor winding and unreliable reel locks — are now the ghosts of control rooms past.

Built for Professionals



ITC's 750 Series Reproducer

1/2 Track Stereo \$1260



Check with any leading automation company for more information or call ITC collect (309-828-1381).



INTERNATIONAL TAPETRONICS CORPORATION

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Form No.: 112-0005

systems and for other playback requirements. The reproducer features a trouble-free TTL control logic, low-noise plug-in electronics and a precision milled heavy cast deck plate.

The 255 has all touch-button control logic with protective motion sensing circuits to prevent tape break or spill when operating from fast mode to play. Automatic tape lifter defeat is actuated by depressing the fast mode button on the transport or remote control. Set-up adjustments and easy maintenance are accomplished by a pull-off front dress panel which permits access to equalizers. XLR output connectors are employed to make the Scully 255 compatible to broadcast standards.

The unit is basically developed as a 7.5 ips (3.75 ips available at no extra charge) two-track, two-channel system, and is available in all standard mono and stereo configurations.

The Scully 255 accommodates reels of five, seven, and 10½ inches. The unit is operated by a single speed direct drive hysteresis motor plus two torque motors, and has differential "fail safe" spot brakes.

Hubs and reels correspond to the NAB requirements. The 255 does not come equipped with 25 Hz tone sensors in the unit, but they are available as an option.

Otari ARS-1000-DC Automated Radio Station Reproducer

The Otari ARS-1000-DC produces a widely used two-speed (7½ ips and 3¾ ips) reproduce-only tape machine specifically designed to meet the unique needs of the automated radio broadcaster. The machine is engineered for heavy-duty, continuous operation, with special emphasis placed on long-term reliability, simple operation, consistent performance, and ease of maintenance.

Included in the unit are: ruggedly constructed motors and brake assemblies, gold plated PCB connectors, long-life pinch roller assembly with polyurethane tire and friction-reducing bearings.

The ARS-1000-DC has an adjustable output level and head azimuth to minimize stereo phasing errors.

A front panel Ready Light indicates, even from a distance, that tape is threaded properly and that the machine is ready for



Watch the bouncing ball? No way. WAJB (FM) Pensacola, Florida, morning man Bob Lane concentrates on live assist while outside the studio golfers play the ninth hole of the Santa Rosa Shores Country Club, which is owned by WAJB's president T. A. Barba.

the next command. Operational ease is provided by simple interlocked controls and a straight line tape threading path plus flip-up head cover.

Noise of the ARS-1000-DC is minimized by use of an IC head preamp mounted directly above the head assembly. Transformer voltage controlled torque motors are used with external, fully-adjustable band brakes. Brakes are completely fail safe in case of a power failure.

The unit is equipped with NAB reels and NAB reel precision hold down knobs.

The ARS-1000-DC features inbuilt 25 Hz sensor and variable time delay.

Ampex ATR-700

Although Ampex does not manufacture a reproduce-only machine, its ATR-700 recorder/reproducer is a popular model used by many stations employing live-assist.

The ATR-700 offers versatility, built-in convenience and durable audio quality. The

controls are up front, with easy-to-read back lighted non-glare glass VU meters. The unit features a balanced mike input with switchable 20 dB attenuator, and an integral four-in, two-out mixer with master gain control. A pause button provides added cuing ease and fast starts, while the pinch roller automatically swings away when in the stop mode to allow faster and easier threading. The ATR-700 lets you assure proper tension for five, seven, and 10½ inch reels with a front panel reel selector for greater tape speed precision.

Maximum performance is made easier by a switch for bias, equalization and reference level, all on the front panel. Maximum maintainability is provided by modern, plug-in printed wiring assemblies (PWAs) that give rapid access to the ATR-700's electronics.

All units are available in choice of speed pairs — 3¾ and 7½, or 7½ and 15 ips. Every ATR-700 includes two-channel electronics, so if the machine is ordered as a single track to start and later develops different requirements, the recorder can handle those needs. Precision head stacks for full, two or quarter track configurations are plug-in accessible, allowing easy replacement or rapid changes to suit various requirements.

Revox A77

The Revox A77 Stereo Tape Recorder is another model commonly found in studios and is known for its reliability. The machine is a result of professional design which successfully combines the advantages of a solidly constructed tape transport mechanism with the advantages of an advanced electronic circuit design. A three-motor transport mechanism with electroni-

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immediacy and presence of 'real live people'.

It is not uncommon for an AM/FM combo providing separate programming to have its all-night personality perform live on the AM and service the FM facility every hour or half-hour, depending on the station's circumstances.

With live-assist programming, you can



Ampex ATR-700 recorders are used by WXLW, Indianapolis, Indiana, morning air personality Nate Humphreys.

combine some of the best of both broadcasting worlds.

Equipment manufacturers who provide stations with live-assist (and automation) hardware are, as you can imagine, numerous and offer a wide price range depending on the quality and function of their products. For brevity, we have selected some of the better known suppliers whose products are found in stations throughout the world.

We have highlighted certain machines and some of their features, but not a complete description of any individual unit. Therefore, if an item is mentioned on one piece of equipment and not on a competing unit, this is not to imply that the equipment is not contained within the other's product. Nor is this list an endorsement of any product. This is just a rough sketch on some of the live-assist equipment available and their functions. The following material has been supplied by the manufacturers.

REPRODUCER TAPE DECKS

ITC 750 Series

The overall objective of ITC's 750 Series reproducer is to provide a professional reel-to-reel playback unit which is competitive in price with the "consumer" machines. The machine is durable, reliable and practical, and eliminates unused features and controls. The result is an open reel unit that withstands the stress of continuous operation and provides the dependability demanded by broadcast applications, especially by unattended automation systems.

The 750 Series has been designed to get the most out of the least. This simplicity has been accomplished through the use of plug-in assemblies (head, relays, circuit cards

and motors). Essentially the machine is constructed from several individual operating units — electrical and mechanical — to permit quick servicing and handy access provided by modular construction.

The uninvolved tape travel path makes tape threading virtually foolproof. Loading tape is easy on the uncluttered deck. To maximize phase stability, the four tape guides have been secured directly to the deck plate, to assure a fixed and accurate tape travel path. A spring-loaded flip top cover makes the head convenient and visible for editing, cleaning and adjusting.

The unit handles one-quarter inch tape and either NAB or EIA hubs with diameters greater than one-and-three-quarters inches. Maximum reel flange diameter is 10½ inches. Selectable tape tension is offered to handle small or large reels. Inbuilt 25 Hz tone sensors are not included in the unit but are available to be used with the reproducer.

Scully 255 Reproducer

The Scully 255 Professional Tape Reproducer is a ruggedly constructed, competitively-priced machine designed for continuous operation in automation



Specifically designed for automated systems

Otari, Japan's leading producer of professional recorders, announces the ARS-1000 Automated Radio Station Reproducer. This new machine is based on the successful MX-5050 professional recorder, with several components modified to meet the special needs of the automated broadcaster for consistent quality and greater reliability under heavy duty continuous operating conditions.

Compare these features: 2500 hours MTBF; 7½ or 3¾ ips; front switchable speeds; preamp in

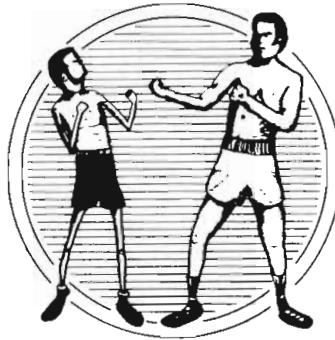
head assembly for minimum RFI and improved S/N; optional 25 Hz sensor; improved low frequency response for reliable 25 Hz sensing; +4dB 600 ohm output; improved flutter performance; plug-in boards with gold-plated contacts; nationwide parts and service from Otari MX-5050 service centers (mechanical parts are interchangeable); one year parts and labor warranty.

If you're considering automation, ask your automated system supplier for full details on the ARS-1000 or call Otari.

OTARI

Otari Corporation
981 Industrial Road
San Carlos, California 94070
(415) 593-1648 TWX 910-376-4890

AM STEREO



FM STEREO

How Will They Compare?

by Donn R. Werrbach

For over a year now, a lot of 'noise' has been generated on the subject of adopting a standardized system for AM stereo broadcasting. Numerous articles have been written; and quite a few debates, hearings, and lectures have been held on the subject. Still, the issues seem clouded in many instances.

Often the different stereo system proponents, rather than clarifying the issues, have tended to leave the observer wondering about some of the most basic problems. There has formed a battle of specsmanship; incomplete or ambiguous information has been given instead of really honest, straightforward admissions and truths about the various systems proposed. Those of us who have waded through all the volumes of data and discussion which has been put out by the different proponents, the National AM Stereophonic Radio Committee and others, find that there is substantial contradiction in claims which are made by the system proponents about their competition.

There can be no doubt that *all* of the systems thus far proposed for AM stereo will actually work. They have been tried and proven, and that truly is the acid test. Surely the different systems have their own weaknesses and demands on the transmitting apparatus, but you can be assured that we will have one of these systems to contend with in the near future . . . and that many AM stations will get their feet wet immediately in the AM stereo format.

Myths Prevail

Besides any misinformation we may be receiving from the AM stereo system proponents while they try to gain acceptance of their own proposals, there is also a stir from old die-hards in the broadcasting industry who, for whatever their reasons, will try to convince us that the AM service is

simply not capable of competing with FM for fidelity and stereo performance.

Before you buy any of these defeatist arguments, please take note that, at least in theory, *there is no reason why AM transmission cannot carry high fidelity, low distortion sound equal to FM transmission.* This is not my opinion, this is fact. Surely there are many practical limits to the quality AM service will be able to achieve and, in the present age, we are very far from the theoretical perfection in the majority of cases. In fact, the monaural quality most of our AM stations broadcast currently is downright embarrassing.

There are ways to drastically improve this situation if concern is given to the whole broadcast plant and commitment is made to using state-of-the-art engineering principles. Don't forget that FM broadcasting has its problems, too. In fact, it has many problems . . . as will be pointed out in this article. First, let's see just how good AM broadcasting can be and review the principle of AM radio.

Engineering manager of KQFM (FM) radio in Portland, Oregon, author Donn R. Werrbach was formerly assistant engineering manager of KEX (AM), also in Portland. Both stations are owned by Golden West Broadcasters, Inc. Previously, Werrbach served as chief engineer of three Seattle, Washington, stations: KTW (AM), now known as KYAC; KCOK (FM) and KUUU (AM), now known as KZOK. Much of Werrbach's electronics training was gained while in government service. His great interest in circuit design led him to study AM stereo.

QUICK COMPARISON: AM STEREO VS. FM STEREO

	AM	FM
Multipath Distortion	No	Yes
Polarization Difficulties	No	Yes
Signal Shadows	Yes	No
Atmospheric Noise Interference	Yes	No
Secondary, Long Distance Coverage	Yes	No
Interference Proportional To Fidelity of Receiver	Yes	No
20 To 15,000 Hz Response Theoretically Realizable	Yes	Yes
Stereo Separation	— Equal —	
High Frequency Response Altered By Limiters	No	Yes
Loss of Effective Coverage Area by Switching to Stereo	No	Yes
Requires Technology Not Yet Perfected	No	No
Car Radio Breakup of Reception	No	Yes

AM Radio Service

Amplitude modulation transmission is performed by generating an RF carrier wave at some specific frequency and causing its amplitude to fluctuate in direct accord with a desired sound wave. The transmission apparatus used to create this effect is responsible for exactly how perfectly the carrier amplitude is caused to mirror the original audio wave. When an amplitude modulated carrier is generated, the physical effect is to translate the audio wave to RF frequencies which are added to the carrier transmission. These extra frequencies, called sidebands, are symmetrically spaced above and below the carrier frequency. Practically any broadcast engineer would know that the sideband frequencies are

cally regulated capstan and solenoid operated servo-brakes possesses few parts which are subject to mechanical wear. The use of a diecast motor chassis and head support ensures that a high degree of mechanical precision and long term stability are maintained even under excessively heavy use. The mechanical and electronic properties thus complement each other in a most successful way.

By completely separating the record and playback electronics with independent magnetic heads, it is possible to optimize their design, and to align the electronics exactly with regard to level, equalization and high frequency bias. In addition, it makes unlimited recording and transfer possible. It provides for off-tape monitoring without affecting the recording process. Track-to-track transfers, echo and multi-play effects can be realized by simply turning a switch without the need for any additional components.

Since the speed of your reel machine is of the essence, it is advisable to check the reaction time of your current unit. Some of the older tape decks do not get up to speed fast enough. A good test would be to take a test tape with a continuous 700 Hz tone and cue into the tone itself, then start the machine and critically listen to determine how long the tone takes to stabilize.

If you are considering the purchase of new machines, it is advisable to actually listen to the machine for mechanical noise of starts and stops before you make the buy, especially if they will be used in a control room with a live mike.

Cartridge Playback Machines

ITC has engineered a compact cartridge machine labeled the 3D Series. The unit features three cartridge reproducers in the space ordinarily devoted to two machines.

All decks may operate at once supplying independent audio and control information. Audio may be fed to three separate console inputs or may be switched externally as directed. The program reproduce amplifiers include an IC electronic "squelch" circuit which independently turns off the audio output when the deck is idle and permits the mixing of all three decks into one console input without sacrificing desirable signal-to-noise ratio.

Automated breaks can be set up easily with each deck automatically starting the next through utilization of an optional 150 Hz cue.

ITC also produces the SP Dual Mount and WP series single cartridge machines.

For optimum tape drive, the machines employ a powerful direct drive motor with permanently lubricated ball bearings. The first step toward speed stability is the use of the time-proven hysteresis-synchronous design. To minimize wow and flutter and to improve pulling power, ITC uses a capstan shaft with the largest possible diameter. To further assist in speed consistency, the capstan is chrome plated, microscopically roughened (vapor blasted), and hardened (electrolyed).

Programmer Equipment

Microprobe Electronics, Inc., manufactures the MEI 100-B Model Programmer. The unit is suited for the broadcaster who is interested in an inexpensive and flexible approach to live-assist or full automation. The MEI 100-B controls eight sources including tape decks, Carousels, single or triple play cart machines, or even a microphone — in any combination.

The model is fairly simple to operate — just dial in any sequence or machines

Live Assist Facilitates Greater Format Control

desired to play. The Programmer will then play that sequence while your operator concentrates on news writing or other production work. Twenty-four events can be dialed in a continuous sequence, after which the 100-B Programmer automatically returns to event #1 and repeats.

The number 9 may be dialed into the sequence at any point, and that will cause the Programmer to return to event #1 and repeat.

The entire program is in plain view at all times. Changes can be made immediately and without confusion.

The machine contains a special 'hold-and-continue' feature which allows the operator to maintain whatever degree of manual control is desired, even to the point of stopping after every song or commercial.

Additional features include: Adjustable Deadroll — to allow for tight or loose music cueing; Overlap Audio — utilized with the proper use of tones, two audio sources may be on the air at the same time, making it possible to do voiceovers; and a Remote Advance (available at a remote plug).

Available options include the following: Lazy-Time, a circuitry that makes the same decision that an operator would regarding whether to go into a commercial break or play more music in case it's too early for the break; Silence Sensor, protects against tape breaking or operator absence. After 10 seconds (or more) of silence, the Programmer will search until a source of audio is found and put it on the air.

Benefits of Program Firms

Decisions, decisions . . . There's a lot to consider when committing to live-assist or automation. The end product — what you program — is, of course, your most important decision. Even the most elaborate, scientifically engineered equipment doesn't mean a thing if the listeners don't like what they hear on their end of the radio.

That's why a qualified programming

company can be so vital to the success of the broadcaster. Their expertise in the knowledge of music control and consistency continues to be important with the rapid increase of record releases. In many markets, the lack of statistical aids such as record sales charts and non-availability of recent disks may cause an inexperienced music or program director to wander astray on his playlist.

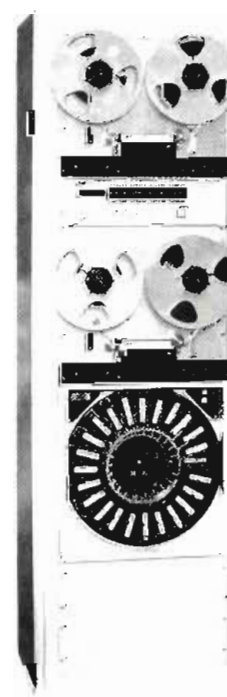
Just the time committed to local music programming can be a recommendation for live-assist use of a pre-programmed format. Sifting through new releases is often delayed until the pile becomes too big . . . and too old. Time previously spent in the weekly music meeting can be much more productive in the production studio, creating spots, refreshing old copy and producing good PA or news programming.

For stations employing programming services — once the correct music is locked into the library, sub-library and recurrent reels, and the programming wheels are set for the various air hours of the station — there is little room for misunderstanding and even less for violation of the music format desired by the station management. In some cases, turntables have been eliminated from on-air control rooms to prevent unauthorized 'additions' to a delicate, well researched format balance.

The future of live-assist is here today, and we'll be hearing more and more about it both on and off the air. Live-assist programming speaks for itself. □ □ □

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AM STEREO

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Polarization Difficulties	No	Yes
Signal Shadows	Yes	No
Atmospheric Noise Interference	Yes	No
Secondary, Long Distance Coverage	Yes	No
Interference Proportional To Fidelity of Receiver	Yes	No
20 To 15,000 Hz Response Theoretically Realizable	Yes	Yes
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High Frequency Response Altered By Limiters	No	Yes
Loss of Effective Coverage Area by Switching to Stereo	No	Yes
Requires Technology Not Yet Perfected	No	No
Car Radio Breakup of Reception	No	Yes

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By isolating the tape from external influences we minimized tape tension to a constant 80 mgs. Providing extremely stable tape transport and low head wear. While reducing modulation noise and wow and flutter to a point where they are barely measurable on conventional laboratory equipment.

Electronically, too, Technics RS-1506 provides the same level of professional control as its predecessor. A separate microphone amplifier. Mixing amplifier. And separate three-position bias equalization switches. While IC full-logic function permits absolute freedom in switching modes. Also available is an optional full-feature infrared wireless remote control (RP-070). It lets you operate

all transport functions and record from up to 20 feet.

For the same performance as the RS-1506 with the convenience of auto reverse, there's the RS-1700.

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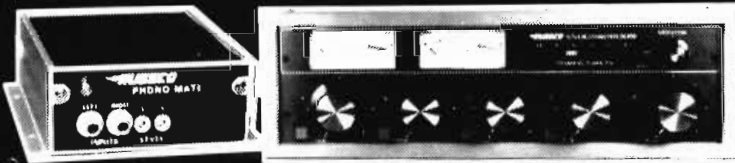
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related to the carrier and audio waves by:

$F_{lsb} = F_c - F_m$ and $F_{usb} = F_c + F_m$,
where F_{lsb} is the lower sideband frequency, F_{usb} is the upper sideband frequency, F_c is the carrier frequency, and F_m is the audio frequency.

Naturally, since speech and music consist of complex waves having many simultaneous and changing frequency components, the AM sidebands will be generally complex and multiple. *If the transmission system and receiving system both preserve the accuracy of the carrier and sideband information, then perfect sound reproduction at the receiver will be achieved in AM service.*

Since the higher audio frequencies generate wider spaced sidebands, it is clear that the channel space an AM station occupies is based on how wide an audio frequency response is represented. If a station were broadcasting music with full 20 kHz response, then the occupied channel space (bandwidth) would be 40 kHz (consisting of the carrier frequency centered in the channel and upper and lower sidebands extending out 20 KHz).

In the United States, legal channel limits do not permit such width as this, but the FCC does allow any AM station to transmit sidebands out to (but not including) 15 kHz above and beyond assigned frequency. This translates to a frequency response capability of *any AM station* licensed by the FCC to theoretically be flat from 20 Hz to 14,999 kHz. Although this does not match the extremely wide response capability of FM monaural service, it does match the extremely wide response capability of FM stereo service which is certainly the predominant form of FM service in North America.

AM broadcasters can take note that FM stereo service is limited to less than 19 kHz frequency response due to physical restrictions in the multiplex system and that virtually all FM stereo stations are restricted to the upper limit of 15 kHz due to limits in current technology of stereo generators.

Hi-Fi Qualities of FM

There is little point to describing the reasons why FM is a hi-fi medium, since this fact is universally accepted. FM and FM stereo have been successfully exploited for many years as a hi-fi system of transmission. Let us not forget, however, that in early FM broadcasting, many difficulties were experienced by station owners in gaining consumer acceptance. Things were so bad for the FM industry at one time that some station owners virtually gave their stations away for nothing after unsuccessful attempts to make them profitable.

It was really the advent of FM stereo multiplex that eventually boosted FM to its present dominant state in the industry. There are many transmission (or reception) difficulties faced by FM that only the desirability of stereo reception motivates listeners to disregard.

Radiation of FM Signal

Since FM broadcasting is allocated to the VHF frequency spectrum, the propagation of the FM signal is essentially a line of sight matter. Of course, some bending and refraction is known to occur to the FM signal, but basically the waves will travel in

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kHz range would be expected to occur at around 10 dB down from sounds around the 500 Hz and below range.

The picture today is most certainly different in terms of frequency distribution of peak energy. Today, music may often have even peak energy distribution. This means that the old 75 microsecond pre-emphasis causes tremendous overmodulation with today's music unless drastic high frequency limiters are used, or unless low average modulation levels are tolerated. There is a very strong trend for FM stations to try to boost their loudness by increasing the average modulation. This, in FM, *always* results in a general loss of high frequency response.

There are numerous ways for FM stations to handle excessive highs from HF clipping to fast AGC limiting after pre-emphasis. All methods of modifying the HF peak levels to prevent overmodulation due to the pre-emphasis curve are, in effect, dynamic pre-emphasis eliminators. Since the FM receiver has a fixed de-emphasis, the listener receives program audio which has its high frequency components modulated by the particular constants of the transmission program limiter in use.

Most of the commercial FM limiters have been designed to "do their thing" in the least detectable way so as to fool the average listener into thinking he is getting hi-fi sound. In the studio, however, if you listen to the difference between the direct record playback and the air signal after processing, you can easily hear the effects of the high frequency limiting. Until the FCC and the industry agree to drop the pre-emphasis curve for FM broadcasting, the loud FM stations on the dial will have dynamically flat response to only 500 Hz!

AM radio has no such pre-emphasis to worry about, and can achieve high average levels of modulation without creating the dull, swishy sound effects of FM stations that try to sound equally intense. In fact, it has been demonstrated that KEX [Portland, Oregon], broadcasting music and announcements over our normal transmission system, has sounded decidedly better than many of the FM stations in our area when received through a special wideband receiver built for the demonstration. The distortion levels were somewhat higher on the AM transmission, but the spectacular high frequency response of KEX really made those FM stations sound fatiguing to listen to. I am happy to report that my FM station [KQFM, Portland] did stand the test, though, and helped keep the faith that FM really can be hi-fi... if you try hard enough!

Current AM Performance

So far I have demonstrated that AM is capable, in theory, of transmitting a high fidelity signal, and that the primary coverage area of an AM signal suffers from fewer propagational defects than an FM signal, in most cases. There are many practical restrictions to achieving this hi-fi transmission in today's technical state-of-the-art, though.

Generally, in today's AM broadcast facilities, there are two chief weaknesses which disallow the attainment of near theoretical performance. Inadequately designed antenna systems are the greatest problem, and imperfect transmitters are second.

For a perfect AM signal to be radiated by

straight lines from the transmitting antenna to the receiving point. In the process of travelling, these waves often cast shadows over a large portion of the desired coverage area since any object of any mass or conductivity will absorb or reflect the waves out of their normal path. It happens that in a very large percentage of any FM coverage area only reflected indirect waves are present at the receiving antennas.

As might be envisioned, often these indirect waves come to the same point from a great many different paths and sometimes result from several reflections. When this happens, *multipath reception* is said to occur. Naturally, multipath will be more frequent in downtown areas where tall buildings block and reflect signals, and on hilly or mountainous terrain. If the multiple signals arriving at the receiving point are from different path lengths, they will arrive out of phase, or displaced in time, since it takes one wave longer to traverse the greater path length. When this happens, the FM receiver gets confused about which wave to use, and distortion is the result.

Of course, the degree of distortion depends on how many differently timed waves arrive at the same point, and how far out of phase they are. Sometimes the effect will not be noticed, and other times it will completely destroy the listenability of the signal.

One of the more ironic problems about multipath is that the higher the fidelity an FM station attempts to broadcast, the more effect multipath exhibits. If an FM station is transmitting music with very clean highs which are essentially unaltered out to 15 kHz, then even a slight multipath will cause the highs to become distorted. This effect is so pervasive that there will be at least some area within any FM station's primary service contour which will simply not be able to obtain good enough reception to prevent the hashy highs. Stations not broadcasting wideband audio (of which there are plenty) will be bothered by multipath distortion less, and this may be a reason why so many FM stations are content with their muddy sound.

The Polarization Dilemma

A tricky problem facing FM emission is *polarization*. Horizontal, vertical, dual, and circular are terms describing types of FM signal polarization. A straight up and down whip antenna, for example, is sensitive to receiving basically only *vertically* polarized radio waves. A horizontally-oriented antenna picks up only horizontally polarized waves, etc.

Early FM stations began with horizontal polarization transmission because the horizontal wave is less susceptible to being blocked by appurtenances and is less quickly absorbed by the ground as it travels along its path. It became obvious later that, with car radios capable of FM reception becoming abundant, the vertical car antennas were not doing well with the horizontal waves. So, to improve car reception of FM signals, vertically polarized transmitting antennas were added to the existing horizontally polarized transmitting antennas. Either a power divider splitting the transmitter output to both antennas was used, or two separate transmitters were used, one for each antenna.

This seemed to cure the car radio dilemma for awhile, and so many stations

began transmitting this *dual* polarization. Ah . . . but! The old nemesis multipath somehow got stronger. It seems that most receiving antennas are at least a little bit sensitive to both vertical and horizontal polarization, and if the two transmitting antennas were not perfectly matched in phase radiated, an automatic direct wave interference resembling multipath was created which would be present virtually everywhere in the service area!

If this were not bad enough, there happens to be the fact that waves reflected off a surface often *change polarization*. If a dual polarized wave was so reflected and changed to two oblique waves, then almost any receiving antenna would receive equally both polarized waves, thus multiplying the effect of the phase interference of the waves.

Circular Polarization

Just about the time everyone was going to give up on the problem, someone invented *circular* polarization. Here, the radio waves do not travel in a single plane, but twist very rapidly through complete turns of polarization. This effect minimizes the direct wave interference problem and still satisfies the needs of both vertical and horizontal receiving antennas. It also is less susceptible to ground absorption than vertical-only waves. The circular wave antenna is a one-piece unit fed by one transmitter, which further simplifies the power feed and feed phase problems.

But nothing is gained without cost! Typically, stations now had to use double the number of antenna radiators to increase the antenna gain to obtain assigned effective radiated power.

It was either this or double the transmitter power. Since doubling the transmitter power is a costly concern, most stations went with a taller antenna. What results is that the antenna radiates a narrow beam of

Ground Conductivity: Determines Range of AM Signal

power which is concentrated to give the effect of a higher-powered transmitter, but only within the narrow beam. Often the antennas are located on top of mountains and beam right over much of the intended service area, giving great service to rural unpopulated terrain, but fuzzy service to the city of license.

Only quite recently has the problem been grasped by many FM stations who have changed to fewer antenna bays and larger transmitters for good local service. The change is very costly and most FM stations still operate with less than optimum transmitting plants.

Shadows Present Problems

Another difficulty encountered with FM transmission is that of signal fade. There are many instances within an FM coverage area where no reflected signals exist, but a shadow is cast by blocked radio waves. These shadows usually are small in size and

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are most often observed by receivers in moving vehicles. Sign posts, light standards, buildings, trees, and almost anything else, including another moving vehicle, can cause them. The result is momentary loss of the FM station tuned in on the radio.

In some cases, the radio might even lock in on a nearby channel when the original station disappears from the dial momentarily. The listener then must re-tune his radio to the desired station; or, as happens most often, the original station will pop back on when the shadow has passed. Most of us who have FM car radios have experienced this annoying effect at some time.

Advantages of Longer Wavelengths

AM radio broadcasting, on the other hand, is allocated to the medium wave (MW) frequency spectrum, which has some very different characteristics. MW signals in the broadcast band are propagated through the ground. They also are radiated as skywaves, but these waves are not used in the primary service area of an AM station. The ground wave bends along the earth's curvature and goes right through buildings, hills, and other surface objects. Consequently, AM reception does not suffer from shadows generally.

The conductivity of the ground to broadcast frequencies will determine the range of an AM signal in a given direction from the transmitting antenna. As a result, range will vary considerably over different geographic locations.

It may seem conceivable that AM could be subject to multipath reception since one could imagine that ground waves would refract in the earth, perhaps causing two waves to converge at a point out of phase. It has never been shown, to my knowledge, that this occurs, however.

The effects of multipath ground wave reception probably are insignificant because of the long wavelength of the AM signal. Any time delay between two arriving waves is surely a bare fraction of a period and would result in no ill effect. Therefore, AM broadcast suffers no groundwave multipath distortion.

Pre-Emphasis of FM

One last big problem that plagues FM broadcast is the 75 microsecond pre-emphasis curve. This pre-emphasis is a fixed high frequency boost beginning at about 500 Hz and inclining at a rate of 6 dB per octave to 15 kHz. Thus, at the high point, a net 18 dB boost is created.

Way back in the early days of FM broadcasting, it was decided that this curve is just right to compliment the natural distribution of peak energy in program material and to help overcome increased noise at high frequencies. This meant that normally, for example, sounds in the 5 to 8

radio. In some markets, this year, FM already has over 50 per cent of the total shares.

The answer to AM regaining dominance may truly be obscure. I feel the answer is academically simple, though. The AM service simply must offer the listener a product that is as acceptable as FM! This must be done by upgrading the AM broadcasting plants to high fidelity standards, convincing AM radio manufacturers to upgrade their receiver designs to hi-fi standards, and by offering stereophonic sound.

It is the promise that converting the nation to AM stereo will accomplish all of those three aspects in one giant leap that has AM stereo proponents excited. Station programmers will have a whole new realm within which they can be more creative with more tools at their disposal because upgrading a station to new equipment might also include upgrading to new methods. AM rate cards might carry two schedules: mono spots and stereo spots at a higher price! Hold it! Let me get back to earth for a minute

Converting most AM stations to stereo won't be easy, regardless of what some of the proponents might say. There's a lot to consider and there are many hidden costs and problems. There are questions about how and when AM stereo hi-fi signals will be receivable; what the service area will look like; how the transmitter will function (or if it will function) in stereo; the antenna... what about fixing it? The studios will need attention to new requirements; program lines need attention; audio processing, etc., etc. Let's go further into these considerations to really get the picture about AM stereo.

AM Antenna Conversion

Let's start with the AM transmitting antenna. It is widely known that non-directional antennas have better bandwidth and impedance characteristics than directionals, *generally speaking*. In any case, unless you are loaded into the pipes of an oil refinery or something other than the usual tower, a single tower non-directional antenna should be the easiest to correct for AM stereo.

The requirements for a perfect AM stereo antenna are to have a wide effective antenna bandwidth (such that the carrier and all sidebands will be radiated in proper phase and amplitude), and that the impedance exhibited by the antenna to the transmitter can be perfectly resistive and of uniform value clear across the utilized bandwidth. Most of the proposed AM stereo systems will require at least a 60 kHz antenna bandwidth for low distortion transmission. It has been stated by proponents that narrower bandwidths will yield acceptable results, however.

Multiple tower directional arrays will be costlier and more difficult to convert because of the mutual coupling between towers, complexities in phasor and power divider circuits, and the need for broadband response of the *pattern*. This means that the pattern should be made to null both at carrier and at sideband frequencies. Patterns with deep nulls may never achieve this simply due to the fact that tower spacing is fixed at the correct geometry for carrier waves, but is a wee bit off at extended sideband frequencies.

Regardless of the response at the null, the major service lobe of the pattern should exhibit flat frequency response. Perhaps, due to physics, no directional pattern can be quite as perfect in all regards as a non-directional pattern; but excellent results are expected from reasonably good systems.

According to Ted Heithecker, a field engineer with the consulting firm of Earl Cullum and Associates, who has discussed this problem with the author over coffee, the best way to approach the broadbanding of a directional antenna is to first broadband the individual towers, and then work on compensating the reactances which are



Checking the antenna monitor of KEX's 1947 Westinghouse 50-HG-1 transmitter is author Donn Werrbach.

present at the common feedpoint. This is the only way the whole antenna will be broadband.

Some antenna consultants have simply worked on the common point, making the transmitter see what looks like an ideal load. The transmitter is happy and works to its best ability, but the antenna is still as bad as before. While this approach has helped some AM stations improve their signal for mono transmission, it is not enough for good stereo transmission. To reiterate, the whole antenna has to be properly adjusted for stereo.

Many Antennas Suitable For Stereo

No doubt many antenna consultants are in for a lot of good work in the next few years fixing horrible AM antennas for stereo, but don't get discouraged about the cost of fixing your antenna just yet. There are many really good antenna systems in existence which will do quite well as first generation AM stereo emitters, and one might be yours. If your common point impedance proofs out within a few ohms of resistance out to 10 or 12 kHz above and below carrier, and the reactance is symmetrical crossing through zero at carrier, it may just be fine for good stereo.

Not much testing has been done with AM stereo in various antennas, and so we just don't know how perfect the antennas must be for *acceptable* stereo transmission — though perfect transmission obviously requires the perfect antenna. It is quite possible that a minimum of new coils and capacitors (and consultant fees) will enable a

great many broadcasters to transmit creditable AM stereo.

Transmitter Conversion

After the antenna is fixed for stereo, the next problem is your old transmitter. The AM stereo systems described to date operate by replacing the crystal oscillator in a standard AM transmitter with a new RF signal generated in the stereo exciter which is to be added to the mono setup for stereo. This substituted RF signal is either frequency, phase, or quadrature modulated (depending on the system to be adopted), with the stereo difference information, or the L-R component.

The transmitter is expected to amplify this signal in the normal manner as if it were the crystal oscillator signal, to the final operating power stage. The sum of left and right audio (L+R), or monaural signal, is allowed to amplitude modulate this new carrier wave in the normal operating fashion. That is, the transmitter modulator is not modified and operates as usual. If the transmitter is perfect, a correctly modulated stereo multiplex AM stereo signal is delivered to the antenna and radiated. Just one problem, though. Who's got a perfect AM transmitter?

It is anticipated that the RF amplifiers leading from the oscillator to the final amplifier in most transmitters, regardless of age, are broad enough to permit proper passage of the angle modulated RF wave. This is due to normal coupling and efficiency considerations for the design of RF amplifiers in general.

But if an intermediate stage is tuned off resonance, or several stages are tuned slightly askew of resonance within the transmitter, it is possible that the L-R modulation component could get out of phase with the L+R envelope modulation, which will cause distortion. Additionally, if the final amplifier tends to change phase as it is amplitude modulated due to changing operating points, or whatever, an *incidental phase* modulation will be added to the stereo transmission which might deteriorate stereo separation or add distortion. The intermediate RF stage bandwidth and the incidental phase characteristics of virtually any transmitter can be measured, but are normally not known since these factors have no bearing on monaural service. It will be necessary to determine these parameters and correct them before going stereo.

Maintaining Separation

Probably the toughest problem to solve in converting a standard transmitter to stereo is the audio phase shift in the main modulator. Most transmitters are known to have considerable phase shift in the modulator string, and this, if left uncompensated, would severely reduce the possible channel separation at various portions of the audio spectrum.

All the AM stereo system proponents have mentioned that they will include phase correcting networks in their stereo exciters which can be adjusted to compensate the modulator phase shifts. This scheme will work in many transmitters so long as there are no complicated phase rotations caused by transformer winding resonances, inductor resonances, or other effects which create frequency selective time delays which cannot practically be counteracted. Some old transmitters with one transformer after

an antenna, the antenna must be capable of radiating the carrier *and* all the sidebands in their correct amplitude and phase. This means the antenna bandwidth must be somewhat greater than the bandwidth of the AM signal to be radiated. Not only must the bandwidth of the antenna be flat and wide, but the impedance the antenna exerts on the transmitter output stage must be uniform at all frequencies across the bandwidth.

These requirements can be met by known methods in many cases. Real difficulties are encountered in trying to design directional arrays to meet these requirements and still perform directionally as required, however; and this problem might be unsolvable in some cases, especially where many towers and many nulls are required.

Often, an antenna null will really be a null at the carrier frequency but not a null at mid to high sideband frequencies. This meets FCC requirements but causes the sidebands to be changed in amplitude and phase with respect to the carrier, causing distorted reception in areas near and in the null. If a station's pattern has lots of nulls, it is common to get a "phasey" sound on car radios passing near or through the nulls where high distortion and weird sound quality will be noted. I personally feel that those stations with gigantic multitower arrays and lots of protection nulls will never quite make hi-fi standards due to the difficulty in dealing with such a complex antenna problem.

Most of the simpler directional antenna systems operating today are not wideband despite the feasibility of such. Emphasis on wide frequency response was seldom placed

in designing antenna systems even until recent times. It is usually considered cheaper simply to design around carrier frequency parameters for antennas than to worry about sidebands. Many antennas in existence are so incredibly poor at handling sidebands that it is impossible to transmit even a mediocre AM signal from them.

Receiver Quality Poor

Most of these poor quality broadcast stations have been able to exist because virtually no hi-fi AM receivers have been

AM Receiver

Quality Took

A Nose Dive

available to listeners. With poor receivers on hand, listeners can perceive less difference between the good stations and the bad than exists. The problem of poor AM receivers at this time is so acute that even top-line consumer hi-fi tuners contain pitifully poor AM sections. And so on goes the myth.

Consumers have to believe that AM is inferior because their expensive AM sets sound so bad, and broadcasters don't bother to improve their lousy quality because they feel the consumer can't tell the difference. As broadcasters, we must consider the fact that AM receivers have

generally gone down in reproduced audio quality since early days. Some of the early Tuned Radio Frequency (TRF) receivers of the Atwater-Kent era sound spectacularly superior to modern sets. Even superhets built by Scott and others in the thirties were very advanced with automatic receiver bandwidth control and low distortion envelope detectors.

So what happened . . . did broadcasters fail to advance with the times keeping ahead of consumer technology, or did receiver makers just decide to arbitrarily design circuits that gave worse and worse performance? I feel that the former case is obviously valid, but I grant that the "transistor revolution" of cheap, tinny, distorted pocket radios of the sixties did do its share of damage.

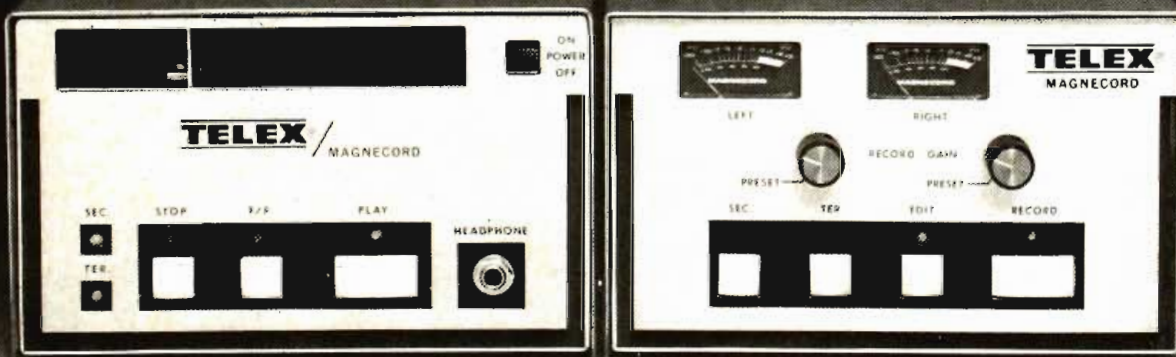
If you take a look at your own AM station, do you see signs of antiquity? What about those rim-driven turntables with the shredded felt on top? Is the rumble 60 dB down? What about the isolation amps in your rack . . . full of 6J7 tubes? These tubes were used in state-of-the-art equipment over 30 years ago!

This all brings us to the crucial question: What is the fate of the AM broadcast service?

AM's Future . . .

Intense interest in this question has surfaced over the past three or four years because of a seemingly sudden rise in the popularity of FM radio stations. AM'ers have felt and are feeling the bite more and more in Arbitron, Pulse (now defunct), and other market surveys. The fact is that market shares are being grabbed by FM

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continuous waves. These waves are generally very complex in frequency and amplitude components, and propagate generally much farther in the AM broadcast frequency band than in the FM band. Natural RF noise fits this description as well.

If the interference energy is appreciable compared to the strength of a signal being received by an AM receiver, some of the interference signal will pass through the antenna and front end tuning circuits of the receiver, and be added to the envelope of the desired AM signal. The envelope detector in the receiver will then demodulate the noise along with the radio program audio. Effectively, then, the radio listener hears the annoying crackle, buzz, or hum interference over his set.

The loudness of the interference is in proportion to the ratio of interference to the station's signal strength. When the radio station signal is strong, the receiver automatic gain control (AGC) is causing the receiver to have relatively low gain, and a given interference level causes a lesser degree of annoyance. If the receiver is tuned to a weak station, the AGC raises the receiver sensitivity and the same interference signal will seem much more severe.

Since most interference noises are very broadband, often covering huge portions of the RF spectrum, there is a relationship between receiver bandwidth and noise susceptibility of AM receivers. The wider the receiver bandwidth, the more noise is admitted into the envelope detector. It is probably this fact that causes many receiver manufacturers to incorporate very narrow bandwidths in the common AM radio set.

Interference Less Troublesome To FM

An FM receiver is not sensitive to this type of interference, since it is specifically designed not to respond to signal envelope variations. Usually, a combination of hard limiters and high gain amplifiers are used in FM receiver intermediate frequency amplifiers to strip off any amplitude modulation which gets added to the FM station signals. Since comparatively little interference energy exists in the FM band, and amplitude limiting is used in the receivers, the noise susceptibility is low.

However, there is a case where FM receivers can be prone to atmospheric noise interference. If the incoming FM signal is below the threshold of limiting in the receiver, or if the signal strength is not enough to let the IF amplifiers strip off a strong interference pulse, then many receivers will demodulate the noise spikes with the FM signal. This happens because FM discriminators and ratio detectors, used for FM detection, are both amplitude and frequency sensitive and rely on the limiting to eliminate the amplitude interference. Some of the latest FM tuners are using phase locked loops for FM detectors, and these are insensitive to AM. One of these tuners would be least sensitive to atmospheric noise.

Some Solutions

We are talking about building wideband receivers for AM stereo reception. Therefore, we can expect to have more interference sensitivity in the hi-fi radio sets than in the present low fidelity types. The answer to this problem is, unfortunately, a compromise.

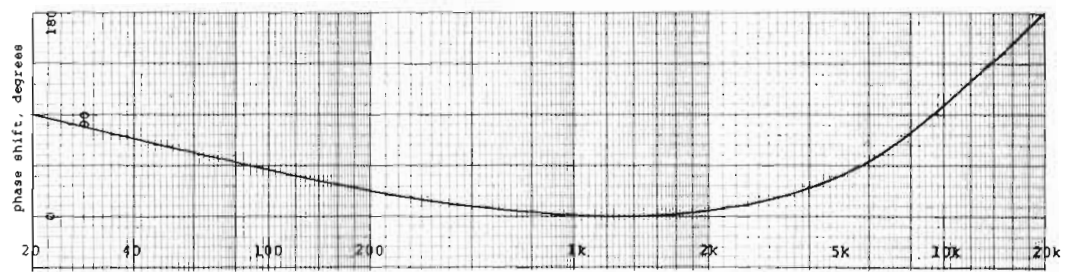


Figure 3
KEX Transmitter, Westinghouse 50-HG-1, 50 kw Modulator Phase Response, Audio Input to RF Envelope, at Plate Tank Sample.



Figure 4
KEX Transmitter, Westinghouse 50-HG-1, 50 kw Modulation Response, 50 Per Cent Modulation taken at Plate Tank Sample.

Hi-fi AM tuners will have a two or three position switch to select different bandwidths for the receiver circuits. If a desired station is too weak for avoidance of interference in the full bandwidth mode, a narrower mode can be selected to reject the interference.

There is another trick that has found success in communications systems where amplitude noise interference is a problem. The synchronous detector is rather insensitive to noise which is not composed of sidebands related to the carrier. The use of a synchronous detector may become common in hi-fi AM tuners as the cost is low with the use of integrated circuits.

Pros and Cons

With the 1 mv contour, most AM signals are strong enough to override atmospheric noise. There are places where AM stereo at full bandwidth may never find acceptance such as in industrial complexes, certain rural districts not serviced with adequate AM signals, etc. For these places, FM probably gives the best service, due to the extremely high noise levels.

Even though AM is admittedly prone to more atmospheric noise than is FM, the effects of multipath on the reception of FM balance out the scales when deciding on which is better overall. Even mild multipath distortion is such an irritating, fatiguing type of noise that people may opt to accept the usually less irritating effect of low-level atmospheric noise if the AM signal is producing as good a sound quality as the FM, particularly in terms of frequency response. My own experience in the past year using a special wideband AM receiver of my own design has led me to this conclusion.

Perhaps the most obvious advantage that AM stereo might have over FM stereo is in serving the car radio listener. AM stereo will not suffer the effects of the ever-present FM multipath and fading. Clean, low distortion audio of good frequency response with some, but not generally obvious, interference in urban areas can be obtained with AM stereo while driving. Additionally, AM

signals do not get out of range as quickly as FM signals, generally; and the driver could listen to AM stereo for greater distances.

Car Receivers: Yuck!

I would like to air a pet grievance of mine about car radios at this time, since it pertains to the subject at hand. Being a chief engineer for an FM station, I am disheartened about the miserable fidelity produced by FM car radios. In the push to get cassette and 8-track tape players into the radio package, it looks like the receiver circuitry has been sacrificed to the nub.

There is hardly a car radio I have been able to find that has response above around 10 kHz on either the tape player or the FM receiver. The distortion levels in the audio amplifiers are gross, and the frequency response is typically anything but flat, sometimes with a 15 dB boost around 150 Hz. With the bass boost it is impossible to obtain reasonable volume level in the car without driving the amplifiers into severe clipping.

I am hoping against hope that with the advent of AM stereo the quality of car radios will rise. Surely, even with compromised AM stereo receiver bandwidth in car radios, AM stereo would sound equal to FM stereo and tape playback the way the radios are today.

I have drawn heavily upon my own experience as an AM and FM broadcast engineer in writing this article. Surely there are more considerations to the question of AM stereo than I have dealt with here. Attention was given to what I feel are some of the most significant aspects which will differentiate the strengths and weaknesses of AM and FM stereo broadcasting.

My personal interest and motivation towards improving the quality of broadcasting leads me to being rather enthusiastic about the prospects of an AM stereo service. I believe that if AM broadcasters will improve their plants to provide creditable high fidelity service, and receiver makers will reciprocally turn out good radio sets (they say they will), then the AM service will be assured of equal competitive advantage with FM in the years to come. □ □ □

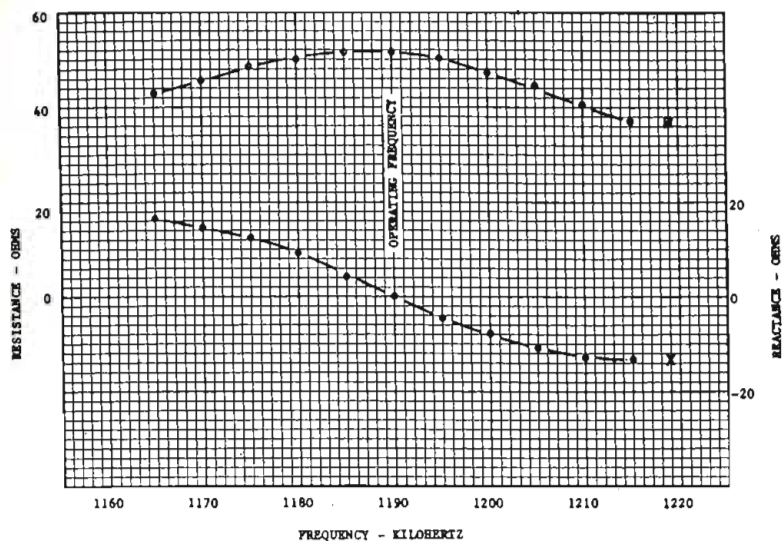


Figure 1.

another in the modulator chain, and L-C frequency shaping filters will probably not work for stereo.

Station engineers anticipating going to AM stereo transmission should be looking at their transmitters right now for all these problems. The more knowledgeable and enterprising engineers may well be able to do something with the old transmitter, while others will just have to pop for a new one capable of stereo.

Transmitter Age May Not Hinder Stereo Capability

At KEX we are operating a 1947 vintage Westinghouse 50 kw high level transmitter into a three-tower directional array. We are reasonably confident that our old transmitter will perform satisfactorily in stereo service. We have made numerous modifications to the transmitter and it now is doing a very fine job in monaural service.

In 1947, when Westinghouse owned KEX (now owned by Golden West Broadcasters, Inc.), the present transmitting plant was built. There was no expense spared in the installation, and the transmitter itself occupies a whole building complete with transformer room, blower room, and 2,500-volt three-phase primary power switchgear. The antennas are Blaw-Knox uniform cross section towers, standing 455 feet tall and guyed at only one point. The towers have a square cross section of approximately seven feet on a side. This large cross section gives the towers an unusually low "Q" which helps to make them broadband.

The transmitter, operating into the antenna common point, is capable of flat frequency response from 20 to 20,000 Hz plus or minus 1 dB when measured at the plate tank sample. The far field frequency response is flat within about 2 dB to 18 kHz. No antenna work has been done to achieve this bandwidth. We anticipate that we will do further work to improve the existing antenna characteristics, however.

Our monaural distortion is around 1½ per cent THD up to 99 per cent modulation 100 to 15 kHz. Low frequency distortion is up to about 3 per cent at 40 Hz at 95 per cent modulation. Some of the new transmitters can do better than this, but in our market we really sound good. I expect that with relatively little expense we will be a very presentable AM stereo station.

A plot of our common point impedance is shown in Figure 1 for an example of what might be a relatively good characteristic for any transmitter to look into. By contrast, Figure 2 shows another antenna impedance plot representing a station in our market which has a very good RF field but rather poor audio response. The resistance and reactance curves are not-symmetrical about the carrier frequency and do not allow symmetrical sidebands to be transmitted. Probably much work will be needed to permit stereo transmission from this antenna system.

I recently checked out the modular phase shift in the Westinghouse transmitter and was a little surprised at how smooth the phase linearity is. Figure 3 shows a plot of the approximate shift encountered. Note that no multiple phase turnovers exist, and

1947 Transmitter

Ready For

AM Stereo

that the 180 degree inversion does not happen until a full 20 kHz is reached! The low frequency phase shift is quite minimal, too. We feel that this simple phase shift characteristic will be easy to compensate for stereo transmission.

Testing Transmitters

If this 1947 transmitter will perform in stereo, then many others of similar vintage may work as well. The phase shift characteristic can be simply checked with an oscilloscope connected to display a modulation trapezoid. The RF sample must be directly from the plate tank sample loop and the audio sample should be the oscillator output at the transmitter input terminals.

Observe the ellipse created on top and bottom sloping edges of the envelope. If the edges are straight with no ellipse visible, then the modulation envelope out of the transmitter is in phase with the audio input.

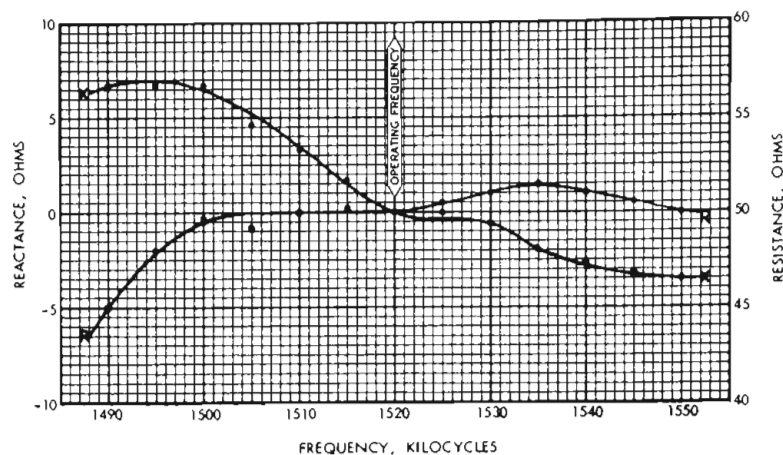


Figure 2.

KEX (AM) common point impedance plot (at left) and plot of common point impedance at another AM station (above).

The ellipse will become a circle at 90 degrees phase shift. The whole trapezoid will reverse direction when the modulation is 180 degrees of out phase with the audio input.

Comprehensive Approach To Stereo

Now, of course, there are going to be problems to the broadcaster other than the antenna and transmitters. Essential to good stereo is a good stereo studio. Any management types reading this article . . . please take notice that you don't simply go out and buy a stereo board and go on the air, as I have heard stated around displays at the last NAB convention! You need a complete conversion to stereo equipment throughout the station. This means adding new tape heads, amplifiers and other parts to your mono cart machines, if possible, or buying all new stereo machines.

ITC is one manufacturer which does sell stereo conversion kits for its mono machines. Scully, Ampex, and many other professional tape machines can be converted to stereo at less expense than the price of all-new machines. Mono machines such as Revox and TEAC may not be feasible to convert to stereo. New stereo phono preamps, cartridges, studio monitors, etc., are needed.

It is not the intent of this article to discuss the needs of stereo studios in general, or to discuss the merits of different types of studio equipment, so let me leave this subject where it stands for the present. If the reader has no experience in stereo operations, I suggest you begin consuming all the literature available from the trade publications and any other source available, for time is of the essence if you want to be in on the first wave of AM stereo broadcasting.

The Big One: AM Interference

With all the discussion about transmission quality so far, I have dealt little with the big argument about the interference susceptibility of AM radio. This factor traditionally is the greatest selling point for FM over AM, and so I have saved this topic for now.

It is true that most of the radio frequency spectrum garbage which we create with engine ignition systems, electric motors, trolley wire sparks, and all the other electrical devices we use, is in the form of non-

about 65 per cent local. The balance is national spot.

While the emphasis is on human interest and light features, stories in a mini-documentary vein provide occasional balance. For instance, *Evening* presented a chilling, six-minute story featuring a woman who had lost a cornea to the disease *herpes simplex*. Reporter Jon Tuttle and cameraman Joe Marks provided a film and synchronous visit with the woman prior to transplant surgery, filmed the operation and talked with her doctor afterwards.

"We generally edit using two rolls and displaced sound, but sometimes we go to A-B-C tracks using fullcoat [16 mm fullcoat magnetic sound track]," Marks explained. "A piece as long as six minutes has to be more sophisticated in order to hold together over that span. Viewers usually don't notice the lip flap and jump cuts that are sometimes necessary in a 30-second news story."

A reporter and camera operator team does not usually prepare a formal script prior to shooting a story, according to Wolverton. Functioning much like a news crew, the reporter and camera operator will deal with elements of a story extemporaneously when they arrive at the scene. Structured planning begins after returning to the station.

"They will discuss how it will best go together visually and what the salient points that the script needs to cover are," said Wolverton. "The reporter will write the script and record narration, usually on

fullcoat. Then we cut them as A-B or A-B-C [with an additional track for music or special effects] simulrolls, depending on how much production is involved."

Although KGW-TV operates three RCA TK-76 ENG units, *Evening* is more than 90 per cent film. The show is part of KGW-TV's news manager Dave Linder's operation.

"Occasionally, when we have something to do very late in the day or something that we feel would be better suited for ENG, we can borrow their [news] equipment and use it," explained Wolverton. "Our budget wouldn't handle dedicating a complete ENG outfit and editing station to the *Evening* program and our photographers prefer the extra flexibility and mobility they get from lightweight film cameras."

Evening typically consists of five segments with four commercial breaks.

"In a given segment of the program, we come out of a commercial break," said Wolverton, "and one of the two co-hosts of the show will introduce a piece with whatever lead-in material is necessary to set it up. We would then roll the film and there would be narration on the film from whatever reporter had covered the story. We're talking about pieces that would run three minutes, but some of them would be five or six minutes. The pieces use a lot of natural sound up and have a good film feeling to them, which is what we're trying to do."

One of Wolverton's main objectives is to make the program as current as possible.

Though many of the human interest pieces are timeless, most stories are aired the day they are shot. Cameraman Marks reports that he occasionally will be editing film for the final story as the program is being aired. Emphasis is put on preparing "advancers" for upcoming events and happenings, again to make subject matter seem as current as possible.

In production, *Evening* strives to be topical by airing studio portions of the program live. This means comments of co-hosts and studio interviews with guests are broadcast as they happen. Only stories are pre-recorded. "We are live every night at 7 o'clock," said Wolverton.

One of the oldest of the new breed of locally-produced magazine shows is *Weeknight*, a product of KCRA-TV, in Sacramento, California. In September, the show celebrated its fifth anniversary.

As would be expected, *Weeknight* emphasizes local subjects in story selection. However, about 30 per cent of its production is centered around non-local themes. *Weeknight* has gone as far as Australia to do a feature series. Recently, the show's restaurant critic was sent to the city of Bologna, the gourmet capital of Italy, to enlighten Sacramento viewers of culinary delights overseas.

Executive producer Brad Willis feels that local magazine shows "should definitely reflect the lifestyles of the people in the viewing audience. We should be a mirror of some of the better things, some of the most

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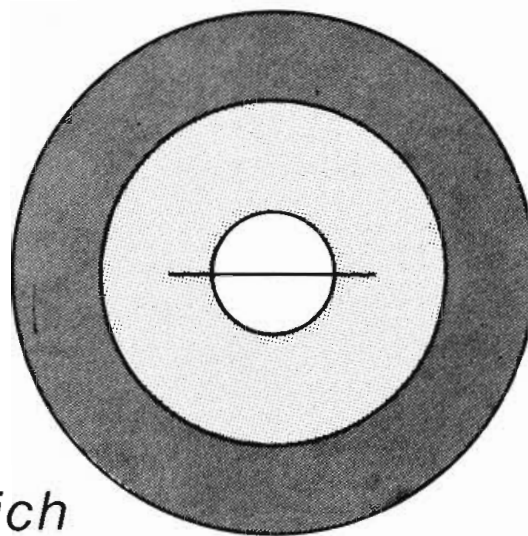
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T. V. Magazine Programs Spotlight Local Subjects
... and pull good ratings, too.

Focusing on Community Life



By David Busch and P. Robert Marich

A fast-growing area of production at TV stations is the magazine formatted program, which aims to capture the character and unique qualities of a community with cameras. The film and video tape stories of magazine shows are distinguished from reports of traditional local news programs by their greater length and greater sophistication from a production standpoint. Since film is a popular medium among the magazine shows, BP&P asked the people at Eastman Kodak to share their experience in this area and help prepare the following story.

Airing five nights a week at 7:00 p.m., KGW-TV's half-hour *Evening* show presents Portland, Oregon, viewers with a steady diet of light feature stories with an occasional news feature for variety.

"Partly that's because the program follows two hours of regular news on the station and I'm just not sure that after two hours of standard news broadcasts that anybody wants to watch a program that has more hard news in it," said George Wolverton, executive producer of *Evening*. "Secondly, we don't really have a large enough staff to do honest-to-gosh, in-depth investigative journalism. It just involves too much lead time, too much research and going down too many dry holes looking for material. We can't afford to do that. We have a full-time staff of eight people who are doing this show Monday through Friday for a half-hour each night."

Wolverton supervises three photographer/editors, two co-hosts who double as reporters/field producers, one reporter/field producer and associate producer Patricia Joy who reports, operates camera and edits. The program accents lifestyle and human interest stories dealing with Portland-area subjects. Each show has a segment that is devoted to one of the following regular features: a restaurant review, a book review, an examination of performing arts and a community calendar round-up Mondays and Fridays.

Local and regional publications are

sources tapped for story ideas. All of the larger out-of-town newspapers of the area are on *Evening's* subscription list. Tips from news-side augment ideas that are self-generated by the *Evening* staff. Then, too, viewers call in with suggestions. In most cases, unsolicited ideas prove to be unsuitable for any number of reasons; but a handful of viewer suggestions are followed up and developed into stories.

"For example, today I got a call from a young lady — I haven't met her yet, but I presume her to be in her early 20's — who says that she is involved in training for the world championships in white water kayaking," said Wolverton. "She asked if we would be interested in doing a story.

"I think it is very likely that we will do a story on her because it obviously has excellent visual possibilities," he continued. "She's a local person. She is doing something that's interesting and unusual."

The format that is designed as an

"intensely local program about Oregonians and Northwesterners" has made *Evening* a leader in its prime time access slot. Since going on the air in 1975, the show has even landed in the number one position on occasion. In the last year the program's original co-hosts left and ratings with the new personalities are not yet available.

"My subjective feeling is that we're doing reasonably fine and our numbers will be reasonably healthy," said Wolverton.

Evening does offer attractive audience demographics to advertisers, according to Harry Godsfil, who handles local sales at KGW-TV. It is essentially the same 18-49 dominated audience attracted by news, but the light feature aspects of *Evening* draws more women.

"The heaviest selling is local because the local people are familiar with it," said Godsfil. "The rep who is 1,000 miles away may have a hard time understanding it."

The five to seven minutes of sold time is



Patricia Joy, associate producer of *Evening*, also serves as a one-person reporting unit. A Portland-area poet is the object of this film report.

manager and a host, who are supervised by Willis. Outside contributors also host pieces that are regular features. These include sports and recreation, gardening, music, weekend events and health.

Video tape records features of the outside contributors. Film is used for the staff-produced stories, which amount to over three-quarters of the total production. Studio portions of the program are aired live.

Reporter/camera operator teams have assignments in a general subject area and develop stories that fit into the assigned category. Specific story assignments are generally given only when a theme show is being planned. Elvis Presley and Reflections of the 1960's are two subjects that were developed into theme programs. Reporter/camera operator teams will work together on a permanent basis, which allows each "to get a feeling for one another's ability," Willis said.

"They take it pretty much impromptu and create the story once they get on the scene and see what the actual elements are," explained Willis. "Nothing is pre-scripted. Of course, you always formulate some sort of plan in your mind's eye before you go anywhere and do a story. You know what the basic elements are, but there is always something to change when you get into the reality of the circumstance."

While both *Evening* and *Weeknight* do not find pre-scripting stories necessary, opting instead to let the reporter/camera man deal with story elements spontaneously much like a news reporting team, some other local magazine programs take the opposite approach.

One program that does work with a pre-production script for most of its stories is *30 Minutes*, produced by WIIC-TV, Pittsburgh, Pennsylvania. *30 Minutes* airs the first Saturday of every month at 6:30 p.m., and in the words of associate producer Philip Metlin, aims to be "more investigative, more hard hitting" than comparable magazine shows.

Generally, the first of the program's three stories fits into the mini-documentary/expose category. The other pieces are usually lighter feature material.

"We actually go out to shoot with a working script so that we don't overshoot and waste a lot of film," said Amy Droz, producer of the show. "Then we come back and spend, usually, about a week editing. We edit double system rather than single system, which is better quality in terms of the audio mix, but takes about twice as long. When that editing process is completed, we transfer it to video tape and add studio leads and appropriate bumpers and opens and closes to each of the pieces."

Droz noted that the editing script is completely revised, in most instances. The pre-production script is "just to get the ball rolling," explained Droz.

Finding a worthwhile topic for mini-documentary treatment involves much preliminary research. When the topic of questionable charities was being consider-



Producer Amy Droz confers with editor Terry Connell (center) and associate producer Philip Metlin (right) on the final edit script to *30 Minutes*, the magazine show of WIIC, Pittsburgh.

ed, a number of sources were contacted. A phone call to the Pittsburgh Better Business Bureau brought an out-of-state fund raising organization to the attention of *30 Minutes*. The organization raised money on behalf of the Pennsylvania Special Olympics from local businesses, who were complaining about solicitation practices of the organization. A *30 Minutes* investigation revealed that the fund raising organization

institutionalizing patients, *30 Minutes* pointed out that budgets of institutions are rising as patient population is decreasing and that financial support for rising numbers of released patients is relatively unchanged.

"We got a lot of rather dramatic film of former patients both telling us their problems and seeing the conditions that they were living in, which were really substandard," said Droz.

When researching topics, *30 Minutes* looks for several important elements before making the commitment to develop a story.

"We look for the key interview," explained Droz. "For instance, if we're going to be doing something on mental health, we're going to need to talk to representatives from state institutions and from community services. The key interviews, however, are going to be the patients themselves who are willing to talk to us on camera.

"Or if we're doing something on prostitution, they key to it would be talking to a prostitute," Droz continued. "Or shoplifting — the key to it would be to get a shoplifter who is willing to appear on camera. So we make sure we have that interview and make sure we have the necessary visuals to accompany it. If we're going to do something on occupational cancer, which is what I am working on now, we make sure that not only are we going to have the victims or the families of victims who are willing to talk to us, but also get into plants to get the B roll . . . the visuals."

Metlin noted that a story will typically have a pro versus con or a good versus bad. Once the decision is made that a visually appealing story can be produced, arrangements are made for shooting key interviews

Pre-Production

Script 'Gets

The Ball Rolling'

charged a substantial administrative fee from donations it collected.

A personal acquaintance of Droz involved in community service organizations outlined problem areas in mental health services and that subject was developed into a story. A *30 Minutes* report identified many shortcomings in the state's mental health program.

Some patients were released before they were ready to care for themselves. Outpatient support services required released patients to go to clinics and thus did not always reach those in need of assistance. The small allowance released patients received was inadequate to secure decent housing, so many were forced to live in slum boarding houses. Though the philosophy of social services was toward de-



Paul Linnman and Cheryl Hansen host KGW-TV's *Evening* program.

interesting, unusual things that make Sacramento living unique. But I also feel that we have to sometimes go to places people can't go and show them interesting and unusual things to give us a more international image. We also go to places our viewers can visit but perhaps wouldn't think of."

Weeknight, which airs weekdays at 7:00 p.m. for a half-hour, is a unit of KCRA's news department. "Our 55-person news staff is one of the largest in the country," said Roger Ottenbach, "and we found that we had the capability of developing features that just wouldn't fit in our regular news program." Hence, the magazine show was created, in part, to accommodate longer stories.

The station's strong support of its overall news effort is one reason *Weeknight* can support travel. Another reason is advertising, which ranges from six-and-a-half to seven minutes per show. KCRA's advertising department declined to talk about the specifics of *Weeknight*'s advertising position other than to say local sponsors provide the greatest support. The program gets good ratings and has recently been in a virtual tie for the number one position in its slot.

"For the foreign trips that we take, often we are able to negotiate tradeouts for commercial time with airlines for flights," added Willis. "We still pay for our continental travels, meals, etc. There are special trips that we usually take around rating period time that we do get special budgets approved for."

He concluded, "We do have a strong commitment to our news and local production, including *Weeknight*. That strong commitment precipitates money being budgeted for special stories and special series."

Much of the travel involves stories dealing with entertainment personalities. Often, such stories are profiles and will include

interviews with the personalities themselves.

For many of its personality profiles, *Weeknight* does not have to travel great distances. Entertainment figures are available at the nearby vacation/entertainment center of Lake Tahoe and also in Hollywood, to the south. The entertainment/convention center of Las Vegas, Nevada, only 350 miles away, is another location where *Weeknight* can reach entertainment figures. As an NBC affiliate, KCRA has access to name network talent at meetings and showcases.

The local scene also provides subjects for light, entertaining stories. A retired boxer returning to the ring for a comeback attempt is an example of a recent human

interest story. That piece, like most, used a fullcoat C-sound roll interlocked with A and B film rolls.

Willis and photographer Chuck Koteen produced a six-and-a-half minute tribute to three famous area cowboys. Slow-motion photography with a Cinema Products-16 camera and A-B-C roll interlock editing provided maximum effect for the story.

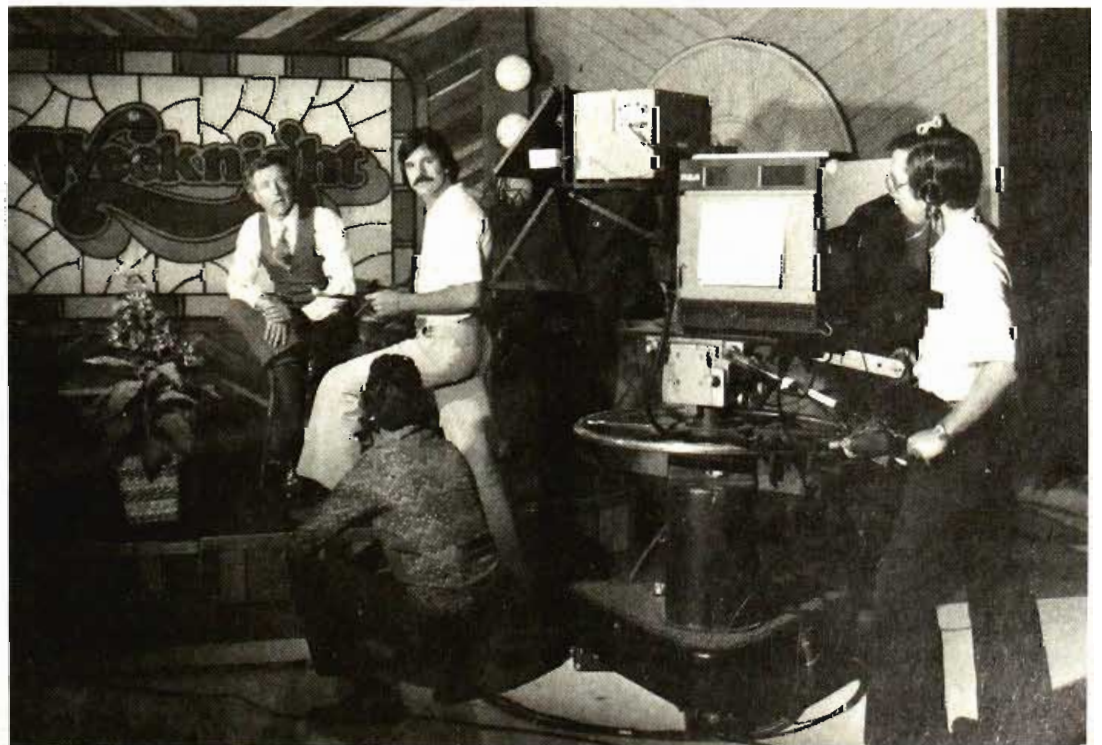
"This sort of work is more challenging for our photographers, all of whom have news backgrounds," noted Willis, a former cameraman himself. "Quick matching of single SOF (sound-on-film) roll to carts or tape, such as is necessary for most news stories, doesn't allow the creative freedom our longer pieces do."

Weeknight also develops occasional harder news features from the Sacramento area. A neighborhood marred by tree-cutting activity was examined in one *Weeknight* expose. A profile of a female impersonator was the subject of another story.

"We'll usually lead with what we call a substance piece, go into a light feature and then have a show-biz segment, where we deal with entertainment and the arts," said Willis. "After that we'll come back with some of our informational, science, medical and consumer-oriented things and then have a light-hearted entertainment piece to close the show."

Stories average three minutes in length, but can range anywhere from one to six minutes running time. Regular features on the show include "On the Go", dealing with national or international subjects; local coverage with "About Town" and "Lifestyles", which centers on consumer tips, medical/science information, and people in Sacramento.

The *Weeknight* staff includes three field reporters, three cinematographers, one video tape camera operator, a production

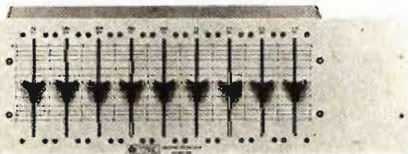


Weeknight executive producer Brad Willis (standing) reviews the script with fill-in anchor Mike Boyd (seated).

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The basic U/F-16 design employs coaxial sprocket wheel assemblies and six terraced horizontal feed and take-up plates accepting one



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The U/F-16 editing console also features a unique hollow polygon prism system for continuous flickerless projection on a bright 8 x 10" screen; crystal-controlled sync sound speeds of 24 and 25 fps, with infinitely variable speed control from 0 to 240 fps, forward and reverse; an electronic time/footage counter with optional keyboard entry, etc. In addition, the unit has been designed to accept a future time-base coding option.

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The KMR-82i will be available in charcoal matte "TV finish". Its accessories are a foam wind screen (included), elastic suspension, wind-proof "blimp" and a unique "active handle" for hand-held use, containing the 9 volt battery for the 48 volt phantom powering converter.

Availability is late in 1978. The price will be about \$795.00.

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Radio Handbook (21st Edition), by William I. Orr, W6SAI, has been introduced by Howard W. Sams & Company, Inc. This is a completely updated 21st edition of the famous communications handbook for engineers, technicians, and advanced amateurs. The book explains in authoritative detail how to design and build all types of radio communications equipment. It contains a greatly enlarged section on semiconductor and IC circuit design. Included are s.b. design and equipment; r.t.t.y. circuits; expanded section on linear amplifiers, both solid state and tube types; v.h.f. and u.h.f. transmitters and converters; special purpose and logic circuitry, as

well as information on new narrow-band voice modulation (NBVM); plus a chapter on electronics mathematics.

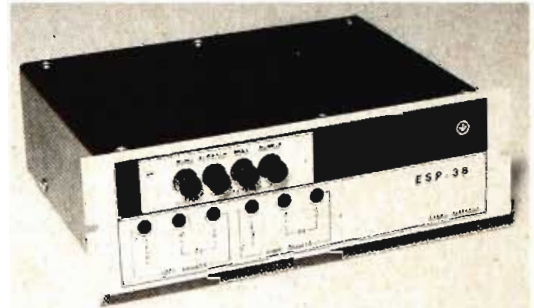
Stocked as book no. 24034, the publisher advises the regular list price is \$21.50. Orders received prior to December 31, 1978 will be honored at the special prepublishing price of \$19.50.

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The unit exhibits a signal-to-noise ratio of -90 dB, typical distortion of 0.015%, gain adjustable to 60 dB, balanced outputs (600 ohms and +21 dBm maximum out) and RIAA tracking of ± 0.5 dB. Extensive RF proofing has been designed in.

The unit is priced at \$325.00.

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PANASONIC VIDEO SYSTEMS DIVISION DEBUTS FIRST ENG/EFP COLOR CAMERA

Panasonic VSD has introduced a three Plumbicon tube, broadcast quality, self-contained portable color camera for electronic news gathering and electronic field production. The unit features operating controls on the front of the camera for convenient use. It is versatile, lightweight (less than 16 pounds), and can be



and B roll visuals.

Droz, Metlin, and cinematographer Terry Connell staff the show. Marni Sarver, WIIC's director of public affairs, acts as executive producer. Host and guest host talent is drawn from the WIIC news room. This arrangement gives news talent greater on-air exposure. For a studio set, chroma-key is used to superimpose graphics behind the talent.

"We like to do visual stories that lend themselves to fast pacing," Connell said. He cited stories on air-traffic controllers and singles bars as examples. For the former, he was able to move around unobtrusively with a Frezzolini LW-16 camera among working air-traffic controllers capturing expressions of intense concentration among subjects. To counterpoint the story, he filmed from the cockpit of a jet airliner as it took off later.

For the singles bar story, Eastman Ektachrome video newsfilm 7250 (tungsten), pushed one stop, provided the necessary speed under the multi-colored lighting of a disco. Connell prefers soft lighting, whenever possible, to duplicate an available-light look, so he "bounces" lights from ceilings or uses a soft direct light.

"With ENG, I couldn't do the sophisticated multi-track sound mixes for frame-by-frame editing I do," he said. "The A roll is used primarily for pictures with B used only for dissolves. That makes it easier on the director. The film segments are combined with the taped studio portions to produce the tape master."

The program does well in ratings. Facing network news on two channels, *30 Minutes* usually ranks second and its four minutes of commercial time is usually sold out. Sarver said the program averages a 25 share and a 10 to 12 rating.

Another magazine program was created in response to what were perceived as the stated needs of the community. KOMO, in Seattle, Washington, aims at exploring local problems in depth, and running timely features that reflect community life and its people on *P. M. Northwest*, which recently succeeded another magazine program on KOMO, *Peopleplace*. The revamped magazine program made its debut in September.

"We are eliminating the studio intros, and going entirely on location for our program which has been changed from one-hour weekly to a half-hour Tuesday through Friday, expanding to five nights a week in December at the close of The NFL Monday Night Football season," said Tom Cohen, director of the program.

"We wanted high-quality production, with no quick-and-dirty stuff, despite the frequency and length of the show," Cohen noted. "Though ENG equipment is used for most programs, film is still a frequent choice, especially for longer stories where there is often concern as to how long electronics' gear batteries will last."

On a recent typical day, the KOMO magazine show dispatched five reporters and five photographers out into the field to look at energy alternatives (wind and solar),

Seattle's restaurant boom, and a local day camp run by an orthopedic hospital.

"Stories can run 20 minutes if they need to," Cohen said, adding that a staff job with the magazine show is one of the most sought-after at the station by KOMO's camera operators.

"The challenge of being able to do the job right every time is appealing," Cohen said. "We have a full-time grip/production assistant to help where needed, and are always willing to take the time to set up and

Requires Touch of Theatrics, Field Production

light our shots. We avoid hand-held mikes and grab shots whenever we can. The pressures at KOMO are not those of deadline, but rather the pressure to keep quality standards high. Story content is our number one consideration."

Viewer response has been generally favorable as *Peopleplace* was a close second to entertainment programming in its time slot.

All four magazine shows profiled attract substantial audiences. Strong viewer response is almost mandatory because of the substantial commitment needed to support production. A magazine program requires an investment in cameras, microphones, editing machines, talent, staff and production facilities.

The alternative to the locally-produced magazine show, airing in prime time access for example, is often a syndicated game show. It is interesting to note that such an alternative, in some instances, can be as little as one-quarter of the budget of a locally-produced magazine program.

Why then do stations opt for the more expensive programming?

Several reasons are often mentioned. The price of syndicated shows is rising rapidly, making it less competitive. The "blood and guts" aspect of some local news shows has spawned much disenchantment and the magazine format, on the other hand, tends to highlight the finer points of a community. Then, too, the magazine show appeals to sophisticated viewers, which many broadcasters in larger markets perceive as a fast-growing segment of their audience.

But probably the most important reason stations opt for a magazine show is image. Magazine shows reflect the lifestyle and character of the community and, by producing such a program, stations will identify themselves closely with the community.

Formats that mix elements of entertainment, human interest and light news feature are most popular, in this regard.

"The magazine show takes more talented field people because there's an element of theater and field production that is not involved in news," noted *Weeknight* executive producer Willis. "And it does take a *budgetary* commitment. Without that, they're not going to work and they're going to remain Podunk Little Shows without much viewer appreciation. But if stations do give them a strong commitment, I think that they're going to prove to be . . . the wave of the future." □ □ □



Director Tom Cohen (seated) and producer Jack Norman discuss timing for a feature story scheduled for *P. M. Northwest*, the nightly KOMO-TV magazine show, at one of the program's two ENG editing stations.

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Model AK-750 has been designed and engineered by Panasonic Video Systems to operate with low power consumption, longer operation on its batteries, resulting in extended operation in the field.

Model AK-750 offers such features as an optical black and white analog memory automatic white balance circuit for stable picture balance; three-way power supply with an AC adaptor or battery pack; built-in bias light which reduces after-image. Resolution is 500 lines center. Signal-to-noise ratio is better than 49 dB (luminance signal) at 200 footcandles F/4.0. Other features include high gain SW, four position filter disc for color conversion and N. D. filters and electronic color conversion circuit, built-in color bar Gen, built-in vertical aperture, built-in Y.1/Q encoder, 1.5" detachable viewfinder with built-in level indicator and battery warning indicator, tally lamp, single block chassis for mechanical stability, automatic cable compensation for optical R. C. U., VTR playback on viewfinder, VTR start/stop trigger on camera head and standard C-mount adaptor.

For a completely portable ENG/EFP system, the AK-750 goes anywhere with the Panasonic Video Systems NV-9400 3/4" portable VCR, according to the manufacturer. To control the start/stop function on the portable VCR, the AK-

750 has a trigger switch on the handgrip for recording. For VCR playback, a separate button is located on the rear of the handgrip. In addition, AK-750 can be used with any other VTR.

**PANASONIC VIDEO SYSTEM DIVISION
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Circle No. 20 on Product Info. Card.

NEW TV CABLE TESTER

A new, high speed, low cost, portable cable tester that detects and displays open, mis-wired and shorted conductors in TV cable assemblies up to 10,000 feet long is now available, according to Muirhead Addison Division, Muirhead, Inc.

Model AS-99D, called the "AutoScan", is ideal for use inside studios or out on field locations. Highly portable, it can be carried easily to do on-the-spot checking of faulty cables. It will quickly show the extent and exact location of the cable faults. Repairs or replacements can be immediately decided upon with absolute accuracy.

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UN-CAN IT.

The tape cartridge is a handy little device. Unfortunately the sound quality of programming varies noticeably between "live" and "canned."

dbx has overcome this problem by developing a tape noise reduction system especially for broadcast use. It provides 30 dB noise reduction and 10 dB headroom improvement. This dbx system offers the same benefits as the dbx tape noise reduction system used by recording studios.

The new dbx 148 provides 8 channels of playback (decode) noise reduction in a plug-in modular chassis (space is provided for a spare module). There are two modules available—the 408, for tape playback, and the 409, for playback of noise-free dbx-encoded discs. Typically, the 148 is used in the control room to playback tapes recorded in the production studio with the dbx 142, a 2-channel, switchable (encode-decode) tape noise reduction unit.

Besides "un-canning" carts, the dbx system extends the useful life of old reel-to-reel machines, quiets audio tracks on VTR's, and even cleans up full-frequency telephone lines and microwave links. Because it prevents noise from coming between you and your listeners—and you and your advertisers—it just may be the most important investment you will ever make.

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