

\*\*\*\*\*3-DIGIT 857  
J750737 D11 9007 9395 437  
BARRY HISHKIND  
2033 S AUGUSTA PL  
TUCSON AZ 85718

# RadioWorld®

Build a LAN  
Step by Step.  
See Features,  
pp. 31-46

Vol 18, No 3

Radio's Best Read Newspaper

February 9, 1994

## Seminar Focuses on AM Directional Rules

by Thomas R. McGinley

**WASHINGTON** On January 13, the NAB's Office of Science and Technology held a quickly organized meeting attended mainly by consulting engineers for the purpose of discussing an FCC Notice of Inquiry (NOI) which contemplates sweeping changes to the rules governing the performance and maintenance of AM directional antenna systems.

This NOI (Docket 93-177) originally adopted on June 14, 1993, was jointly submitted by the technical consulting firms of duTreil, Lundin, & Rackley; Hatfield and Dawson; Suffa & Cavell; Moffet, Larson, & Johnson; and Silliman and Silliman. The FCC has extended the NOI reply comment date deadline to March 1, 1994.

John Marino, manager of regulatory affairs for NAB's Science and Technology department, organized and conducted the ad hoc affair, stating that he hoped the meeting would "help to form a consensus among consultants, broadcasters, equipment manufacturers, and other interested parties in the industry in helping the FCC rewrite the AM directional antenna rules."

William Hassinger, who represented the FCC's Mass Media Bureau, opened the proceedings with an overview of the

Commission's position on the NOI, identified as MM Docket 93-177. Hassinger called the AM directional antenna rules update "a straight-forward matter, long overdue, with no hidden agenda."

### Overall package

He also said that the process is "a natural extension of Docket 87-267 (AM improvement) which serves to reduce interference in the present AM band and opens up the expanded band."

While Hassinger acknowledged that the comments filed thus far in this proceeding have addressed many of the problems with the present rules, there have been no specific suggestions or proposed alternative methods of measurement and compliance verification submitted.

Hassinger admitted that the FCC does not have adequate in-house expertise to craft the rule modifications needed in this arena and that it will have to rely on the industry to supply the necessary guidance. "Without specifics, the commission doesn't know where to go," he said.

Wally Johnson, of Moffet, Larson, & Johnson lamented the disturbing reality which consultants are finding all too common with many of today's AM directional antenna systems. According to Johnson, with the suburban build-up around many arrays and the lack of proper

maintenance, they have drifted way out of tolerance, with monitor points and operating parameters exceeding licensed limits. When given the estimate of what it will cost to properly restore the system to legal operation, station owners are opting instead to do nothing and run the risk of illegal operation until they are caught in an FCC inspection.

The industry can only guess how much interference is being caused by such operators, Johnson added.

He said that under the present rules, a field engineer will spend great effort in

adjusting the horizontal pattern, relying only on field measurements, and in so doing actually distorts the vertical pattern out of its theoretically predicted limits. Nighttime protection limits are exceeded and greater amounts of interference result.

### Better accuracy

Johnson also noted that with "creative analysis techniques," the FCC accepts virtually any set of parameters and measurements to prove a pattern and secure a

continued on page 34 ▶



by Lucia Cobo

**DALLAS** Radio management and sales executives will converge at the Loews Anatole Hotel here for the Radio Advertising Bureau Managing Sales Conference, RAB '94. The three-day meeting begins on February 17.

A number of group owners will be sending their entire management teams to what is being billed as "radio's largest sales meeting." For example, Commonwealth Broadcasting has registered 40 of its managers for RAB '94. Other groups sending at least a dozen of their managers to the gathering include: Heritage Media Corp., Clear Channel Communications, Federated Media, Jacor Communications, EZ Communications, Shamrock Broadcasting, Barnstable Broadcasting, Saga Communications and Buckley Broadcasting.

The theme for this year's conference is "Molding Tomorrow's Radio Marketing Professionals." The conference agenda was designed to provide radio marketers with new information and insight on developing creative approaches to solving problems, managing people and building station revenue.

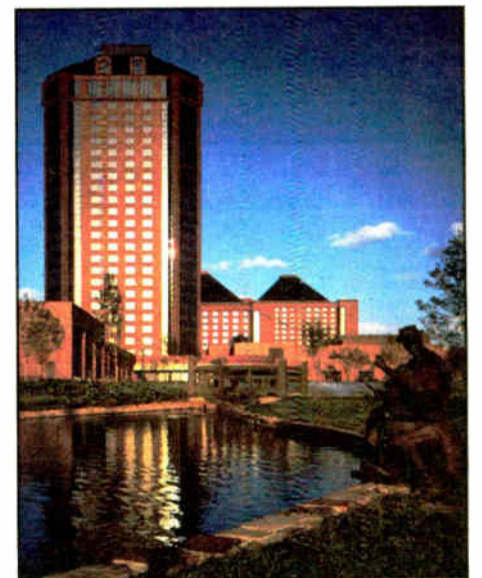
RAB reports that registrations for RAB '94 are 150 percent ahead of last year's conference.

The gathering will be highlighted by a number of keynote speeches and workshops led by the industry's best-known executives, including the NAB's Eddie Fritts and John Abel. David Zach will deliver the keynote address: "An Owner's Guide to the Future, Key Trends for the '90s." A professional futurist, Zach will outline the rise of the Information Age and its "articulate incompetents" and "elegant messengers." Zach will discuss his view of the melding of telephones and computers with fiber

## Dallas Ready for RAB Convention

optic superhighways and its impact on the future.

The rapid pace of change will be among the topics discussed by RAB President Gary Fries. In his opinion, the radio industry is on a "speeding train" and there can be no looking back.



Loews Anatole, Dallas

According to Fries, marketing decisions are being made in today's advertising world based on criteria that did not exist two years ago. In his keynote opening speech, Fries will detail where he sees the business heading and the importance of focusing the power of the business on the future.

Suzanne Rayson will lead a workshop on "marketing sports." She will discuss techniques for selling play-by-play, selling sports without play-by-play, negotiating sports rights, selling sports specials and other ways of making money with sports programming.

continued on page 11 ▶

Digital Audio Made Easy with DAD. No matter what your requirements - one workstation or ten networked - the DAD486x does it best while it improves your bottom line. Unsurpassed quality, flexibility and high performance are standard. Whether you're live assist, automated or satellite, DAD delivers. And you'll love how easy it is to use. Call us toll-free.

Phone: 800-622-0022 Fax: 317-966-0623

HARRIS ALLIED

Circle (74) On Reader Service Card

World Radio History



# NEWSWATCH

## Enco on Compuserve

**ST. LOUIS** ENCO Systems recently placed a dedicated section on Compuserve within the Broadcast Professional Forum (GO BPFORUM), Section and Library 16.

According to the company, the Compuserve service is a quick and efficient source for software updates for the DAD 486x digital audio workstation/delivery system.

## TV Marti Must Go, NAB Testifies

**WASHINGTON** The NAB has again

called for the abolition of the four-year old TV Marti service, a U.S. government TV broadcast into communist Cuba.

During recent testimony before a government panel studying the effectiveness, NAB International Consultant Bill Haratunian called on the government to stop wasting its time and money on the broadcasts, which have resulted in retaliatory jamming on the TV frequency, and interference to U.S. radio stations from high-powered Cuban AMs.

TV Marti programming, a mixture of U.S. news and old TV shows is broadcast in the pre-dawn hours. The transmitter is a mini-blimp tethered 10,000 feet in the air

off the coast of Florida. The balloon has broken from its tether several times.

During the panel meeting, Haratunian asked: "Why are we wasting our time and money trying to send a TV signal through this failed scheme? In a time of budget crisis, there is no justification for this kind of extravagant spending."

In October, Congress appropriated \$7 million for TV Marti for 1994, withholding \$2.5 million pending the panel study into the service's effectiveness.

An older radio service, Radio Marti, has been in existence since the mid-1980s.

## Metro to Get Standard News

**WASHINGTON** An agreement with Broadcast Equities Inc., parent company

of Standard News, and Metro Networks has resulted in Standard News contracting to supply Metro Networks' news. Metro's affiliates number more than 1,000 stations.

"This agreement will thrust Metro Networks ahead in the news business while strengthening our coverage of local, state and regional news," Broadcast Equities Vice President Shirley Thornton said.

## Digital Specialists Named at BSW

**TACOMA, Wash.** Broadcast Supply West (BSW) has assigned two salespersons as digital audio specialists for customer support in the rapidly growing digital equipment market.

Pat Medved, vice president of sales for BSW, said that East Coast Sales Representative Laura Tyson will serve customers east of the Mississippi and Rick Kemp will serve customers in the western region. Both have extensive sales and hands-on experience in digital audio including digital audio workstations.

## NAB Elects Board

**WASHINGTON** The National Association of Broadcasters announced the names of 11 broadcasters elected to two-year terms on the NAB radio board of directors, serving the even-numbered NAB districts. The include:

continued on next page ►

## A Little Bit of MAGIC...



## Revealed!

**THE R-10 IS BASED ON A SIMPLE PREMISE:** Low cost does not have to be synonymous with low quality (as is so often experienced). When you've got Audioarts' experience and expertise, value engineering becomes a task of carefully defining the features required and manufacturing in an efficient manner, utilizing the best of computer and machine technology.

**THE RESULTS ARE SELF-EVIDENT:** the R-10 is a fully modular console, with the componentry you'd expect to see in a much larger design. *No other console in its price range can even come close!*

The R-10 has gold audio switches, gold edgcard connectors, conductive plastic faders, conductive plastic monitor pots, fully burned-in socket-mounted ICs, industry standard machine control switches and, of course, documentation and instructions that make installation really simple.

With the R-10 you can take advantage of Audioarts' reputation and experience, and be assured that quality and performance will be yours.

**AUDIOARTS ENGINEERING**

7305 Performance Drive, Syracuse, NY 13212 Tel: 315-452-5000 • FAX: 315-452-0160

## Index

### RUNNING RADIO

<b>Dallas Ready for RAB Convention</b> by Lucia Cobo	1, 11
<b>Use Research to Your Best Advantage</b> by Bob Steele	12
<b>Learn the Fundamentals of Good Research</b> by Karl Baehr	13
<b>A Progress Report on Digital Radio</b> by Judith Gross	14
<b>Radio Plays Immediate, Crucial Role</b> by Charles Taylor	17
<b>Radio Outlook Is Good</b> by Whitney Pinion	17
<b>On-Air Talent Needs Good Public Presence</b> by Mark Lapidus	21
<b>Ways to Brainstorm Great Sales Ideas</b> by Bob Harris	22
<b>The Art of Hiring: Good Interviews</b> by Sue Jones	24
<b>ABG Sponsors Mini Trade Gathering</b> by Dee McVicker	33

### FEATURES

<b>LAN Plan Beats Walking with Floppies</b> by Richard Mertz	31
<b>Splatter Monitor Cannot Be Beat</b> by Margaret Bryant	36
<b>Satellites Make Sense During Duopoly Era</b> by W.C. Alexander	37
<b>Workbench</b> by John Bisset	39
<b>Storz Music Formula Rescued Radio</b> by James T. Wold	41
<b>Diodes Have Many Solid State Functions</b> by Ed Montgomery	42
<b>Hawaii Stations Head 'Em Off at the Pass</b> by Dee McVicker	44
<b>WTUE Connects to Audience Via PC</b> by Tom Carroll	46
<b>Beware of the Long Arm of the FCC</b> by Harold Hallikainen	48



# CBC Puts Programming on Internet

by James Careless

**OTTAWA** Canada's publicly owned Canadian Broadcasting Corp. (CBC) became the world's first traditional broadcaster to initiate experimental radio transmissions on the Internet global computer network.

## NEWSWATCH

► continued from previous page

District 2 (N.Y., N.J.) John R. Quinn, WJDM(AM) Elizabeth, N.J.

District 4 (Del., D.C., Md., Va.) T. David Luther, WBTM(AM)-WAKG(FM) Danville, Va.

District 6 (N.C., S.C.) Carl V. Venters Jr., Voyager Communications, Raleigh, N.C.

District 8 (La., Miss.) Raymond A. Saadi, KTIB(AM)-KHOM(FM) Houma, La.

District 10 (Ind.) Kenneth S. Coe, WLOI(AM)-WCOE(FM) La Porte, Ind.

District 12 (Mo., Kan.) Curt Brown, KTTS-AM-FM Springfield, Mo.

District 14 (Iowa, Wis.) Don Seehafer, Seehafer Broadcasting, Manitowoc, Wis.

District 16 (Colo., Neb.) Ray H. Lockhart, KOGA-AM-FM Ogallala, Neb.

District 18 (S. Texas) John W. Barger, KRIO-FM San Antonio

District 20 (Mont., Idaho, Wyo.) Larry Roberts, KDXT(FM) Missoula, Mont.

District 22 (Ariz., Nev., Utah, N.M.) Jeff Lyon, KSNM(FM) Las Cruces, N.M.

Coe, Brown, Barger, Roberts and Lyon are new members of the radio board. A run-off election is yet to be held for another new member to represent District 24, serving Southern California, Alaska, Hawaii and Guam. Two Los Angeles radio executives, Howard Anderson of KHWHY(FM) and Kari J. Winston of KBIG(FM) are up for the seat.

Since late December, the CBC has offered digitized samplings of its most popular English-language programs on Internet, the world's largest computer mega-network. Included are the public-affairs program, "Sunday Morning"; the science-oriented, "Quirks and Quarks"; and the off-beat comedy talk show, "Basic Black" with host Arthur Black.

### Two million users

With the move, the corporation has opened up a new world market of about two million users who access Internet over 20,000 smaller networks in 152 countries.

These numbers motivated CBC to take the plunge into "cyber radio" (as radio broadcast over computer cyberspace is called), said Diane Williamson, general manager of CBC Radio's "RadioWorks," which is spearheading the project.

"RadioWorks is a new department within English radio that looks for new markets and opportunities for CBC for post-broadcast product," Williamson said. "Part of it is to look for new audiences and introduce CBC radio programs in alternate formats with an eye not only to attracting listeners but generating revenue."

The latter ambition explains why the corporation includes a text index of transcripts for its "Ideas" program on Internet. These transcripts are offered to the public in an effort to generate cash.

To date, initial tests are being done in league with the government-run Communications Research Centre (CRC), in Ottawa, where programs like "Sunday Morning" are digitized.

"You convert it from sound information to computer information; convert it from waves of sounds into bits and bytes that a computer can use," CRC Research Scientist Dr. Andrew Patrick said. "Once it's in bits and bytes, it can be saved and manipulated, just like any other computer file."

### Via the network

In this form, CRC saves the "sound files" on its own system, transmitting them to any Internet user who requests them via the network. Then, using its 56

kbps modem, CRC transfers the requested files directly to users, who can replay them on their own computers, provided the units are equipped with audio playback capability.

As demonstrated at CRC, the actual access to these files can be quite user-friendly, providing that the Mosaic program interface is utilized. With Mosaic, users simply log onto a series of text-file screens that not only tell them what is available, but incorporate program logos

Of course, the real benefit is control. Using the menu, he can pick and choose desired programs and avoid those does not desire. Moreover, because these files are available around the clock, the user essentially has access to "radio on demand."

### Limiting factor

But there is a limiting factor when it comes to accessing cyber radio—data transfer capacity: The slower the user's modem, the longer it takes to download the sound files.

The problem is that the sound files from which these programs are extract-

**CBC has opened up a new world market of about two million users who access Internet over 20,000 smaller networks in 152 countries... to take the plunge into "cyber radio."**

and photographs to embellish presentation.

To select a program, all the user has to do is move his mouse-driven cursor to the appropriate highlighted title and click it, according to CRC Research Scientist Dr. Thom Whalen.

"When I click on a word, it calls up another page with more images," Whalen explained. "For example, if I click on the title of a part of a radio program, then I will get the radio program playing out of my speakers."

ed are very large. Even two minutes of the simplest audio track—voice-quality mono—requires 1 megabyte's worth of storage, more than is practical for transferring across conventional desktop modems (which usually function at 2400 bps).

For now then, cyberradio is viable only for users with extremely high-speed Internet connections such as colleges and businesses, rather than the average hobbyist wired into his home phone.

continued on page 44 ►

## ULTRAMOD® . . . UM2000 FM STEREO MODULATION SYSTEM



The **UM2000** is a complete FM processing and stereo generating system featuring:

- Dual band, stereo AGC and peak processors of exceptional clarity.
- Digitally synthesized stereo generator with separation exceeding 60dB at 1 KHz, and typically 55 dB at 15 KHz.
- Dual composite outputs for feeding main and auxiliary transmitters or STL's.
- Separate Pilot output for composite processor interfacing.

CALL TODAY!

**HINAT HINDES Inc**

42 Elaine St., Thompson CT 06277  
203-935-9066 or 203-935-9242  
FAX: 203-935-9919

—FOR BROADCASTERS WHO SPEND THEIR OWN MONEY—

Circle (33) On Reader Service Card

# Speak Easy

with the **Comrex Talk Console™**

Radio just took a big step forward with this Talk Radio Package. Easy to set up and easy to use anywhere, it includes everything needed to put callers on the air.

It conferences one or two phone lines with two microphone channels for host and guest. The second mic channel will also accept inputs like CDs or tape decks.

"CUE" lets you talk with the caller off air.

"HOLD" puts callers on hold and feeds program back to them. Integral mix-minus circuitry insures that callers won't hear their own echo when on air.

The Comrex Talk Console for:

- Syndicated Talk Programs
- Radio Features Production
- Remote Talk Show Broadcasts
- Newsroom Interviews



A sophisticated solution in a simple package.

**COMREX**

Comrex Corporation  
65 Nonset Path, Acton, MA 01720  
800-237-1776 In MA 508-263-1800  
Fax 508-635-0401

Comrex (UK) Ltd.  
75 The Grove, Ealing  
London W5 5LL, UK  
081-579-9143 Fax 081-840-0018

Circle (167) On Reader Service Card



# Radio Steadies Country's Nerves

**WASHINGTON** The bulk of U.S. residents spent most of last week glued to their radios and TVs (for those Californians who still had TVs)—thanks to earthquake devastation on the West coast and an Arctic blast on the East.

Instinctively, people reach for their radios when situations are dire. And as far as I can tell, time and again, radio broadcasters are there each and every time, on the scene, relating first-hand the events as they unfold. Television frequently taps the power of radio to keep its viewers informed, relying on the power of the reporter's narration to fill the screen with images its cameras cannot reach.

Once again radio proved it is an essential tool for the dissemination of vital information.

Fortunately, radio does not have to fulfill its emergency role too often. It weaves its way into the fabric of our lives on a daily basis—as it covers the local elections, or the opening of a new retail outlet, or a sports event at a local school. It is, in fact, like a utility. You expect it always to be there when you flip the switch, or turn on the car's ignition.

Of the thousands of radio outlets in the

ones with its own blend of programming and community service. On the air since 1924, the legendary station defies format definition. Self-described as an "adult" station, it blends talk, sports, weather, music and news. It leads the market in many ways: top-ranked AM, top-ranked radio station, top-billing station, etc.

Among WGN's many different programs is the "Kathy and Judy Show," one of the select few radio programs in the nation featuring two women. Recently, Kathy O'Malley and Judy Markey, the program's co-hosts, were honored by

Hancock building on Michigan Ave. Congratulations to all involved.

★ ★ ★

Word from Harman International Industries Inc. is positive at press time. Bernie Girod, chief operating officer for Harman reported that the company's Northridge Business Campus was "somewhat damaged" by the earthquake which shook Los Angeles on January 17. (Look for our earthquake coverage in the next issue.)

The plant tentatively scheduled resumption of full operations by the first week of



Mayor Richard M. Daley proclaims January 11, 1994 "Kathy and Judy Day" in the City of Chicago. Seated left to right... front row: Mayor Daley and WGN Radio News Anchor Steve Bertrand. Back row: WGN personalities Judy Markey and Kathy O'Malley.

Chicago Mayor Richard M. Daley with "Kathy and Judy Day" in the city.

Mayor Daley chose to recognize the two because of their many contributions to radio, print and television, as well as to local charities.

After a ride in a horse-drawn carriage up the "Magnificent Mile," Kathy and Judy were joined for a special lunch and live broadcast by 60 listeners at the Signature Room on the 95th floor of the John

February. News junkies will recall that the earthquake's epicenter was located at Northridge.

In a release, Chairman Sidney Harman expressed his gratitude to company employees and business associates alike: "I am enormously grateful to the 1,400 employees at Northridge who rallied so superbly in the face of adversity—a special brand of courage. I am particularly proud of the leadership provided by

Bernie Girod as we have marshalled every resource to overcome this challenge rapidly and professionally."

Harman went on to write: "I am indebted to our suppliers who acted so swiftly and effectively to help us.

"All of us have been touched by the outpouring of concern for our safety by colleagues, customers, suppliers and competitors. We are in good shape and raring to go."

★ ★ ★

Recognition of a job well done is a painless and effective way of encouraging even better work from people. Radio numbers at least two distinct but equally important, awards for advertising.

The Chassie Awards, which recognize excellence in automotive radio advertising, are sponsored by the Radio Advertising Bureau (RAB) in cooperation with the National Automobile Dealers Association (NADA). The Chassies honor outstanding creativity, originality and production in radio automotive advertising, and are open to RAB member stations, NADA automobile dealers, dealer associations and their advertising agencies.

Radio stations receiving Chassies this year were: WKTK-FM Gainesville, Fla., for best campaign in a medium market with its "Scary/Procrastinate/Toy Cars" campaign for Paul West Ford, and WTOS-FM Skowhegan, Maine, for best single ad in the small market category with its "Late Night TV" spot for Central Maine Motors.

Coming up in March is the deadline for the Radio-Mercury Awards, the richest awards program in advertising. The creators of the year's best radio advertising campaigns will walk away with a total of \$200,000 in cash prizes.

The awards ceremonies will be held in New York on June 15. Phil Guarascio, general manager of marketing and advertising for General Motors will co-chair the event with Les Goldberg, president of radio "megarep," Interep.

Entries must have aired for the first time during the 1993 calendar year on a commercially-licensed U.S. radio station. Last year's Radio-Mercury Awards drew roughly 900 entries.



country, none exemplifies radio's ties to its community, perhaps, better than WGN Chicago. The Windy City is a fortunate town, boasting a large number of healthy, exciting and aggressive radio stations—both on AM and FM.

Tribune-owned WGN, however, certainly earned its place among the great

## Now, Burk pushes the right buttons for clean, clear audio switching.



Get ready for unattended operation that doesn't hiccup when a source drops out. The Burk LX-1 Stereo Audio Selector offers 6 audio channels in a 1 rack unit switcher that's ideal for remote studio control and EBS operations. With individual channel control signals, main and loop outputs, plus line mixing, the LX-1 is the versatile choice for new studio designs.



The LX-1 will run loops around traditional alternatives like patch panels and relay switchers. With configurable line levels, 100 dB isolation, and common mode rejection that exceeds 110 dB, the LX-1 can actually improve your air chain quality. And the LX-1 is especially easy to interface with existing studios and a variety of remote control configurations, including those from Burk.



Place the Burk LX-1 in your audio chain and you're getting the best mix of features, reliability, and performance. All at a price that truly pushes the right buttons for the 90s. Stow the old patch cords away. And take the first step toward putting the LX-1 to work for you. Call Burk Technology at 1-800-255-8090

**BURK**  
TECHNOLOGY



Steven A Downes launched TeamRadio, a consulting firm chartered to provide a wide variety of interrelated support services, including: research, programming, promotions and marketing. Downes is a former NAB board member and most recently served as general manager of WCHK-AM-FM Atlanta.

Scott P. Roberts was named acting director of the Annenberg/CPB Projects at the Corporation for Public Broadcasting. Roberts had been serving as senior project officer.



# READERS FORUM

If you have comments for Radio World, call us at 800-336-3045 or send a letter to Readers Forum (Radio World, Box 1214, Falls Church, VA 22041 or MCI Mailbox #302-7776). All letters received become the property of Radio World, to be used at our discretion and as space permits.

## EBS rebuttal

Dear RW,

A letter in your Jan. 12 issue from Joseph C. Wu, president of TFT Inc., included a number of misleading and unsubstantiated claims which call out for clarification.

Mr. Wu claims superiority of his in-band EBS over RDS (radio data service). In fact, demonstrated superiority of RDS over TFT in-band signaling is evidenced by the results of the FCC-sponsored Emergency Broadcast System field tests in Baltimore where RDS had, on average, a 22.3 percent advantage over TFT's in-band signaling.

In one series of tests, RDS outperformed TFT's in-band signal by over 40 percent. In every test, RDS beat TFT's in-band signaling.

Second, Mr. Wu's controlled comparison in his laboratory was based on a Delco RDS car radio. The Delco unit decodes RDS signals without error down to 5  $\mu$ V of signal. In order to be 20 dB better (100 times), TFT would have to decode its in-band data at .05  $\mu$ V of RF. We don't think so, Delco doesn't think so and any qualified engineer can tell you it's just not possible.

TFT should admit the demonstrated and proven superiority of RDS signaling and stop trying to confuse the facts with hollow and misleading platitudes.

Gerald M. LeBow, President  
Sage Alerting Systems  
Stamford, Conn.

## Cripple Creek concurrence

Dear RW,

I suspect that I am one of the few commercial broadcast operators that concurs, in principal, with the FCC's "Cripple Creek" Notice of Violation against KOA(AM) Denver (RW, Dec. 22, 1993).

Having spent over a decade in the field of broadcast standards and practices, it has been my experience that the FCC's sponsorship identification rule

(Section 73.1212) leaves little room for interpretation. Unlike many of the FCC's rules, this one is explicit and straight-forward. Simply stated, whoever paid for the ad must be clearly identified in the commercial.

As I understand Mr. Cole's analysis of the "Cripple Creek" case, a consortium of businesses were mentioned in a series of commercials that promoted goods or services available in Cripple Creek, Colo. "Logical conclusion(s)" could lead a listener in several directions:

(a) The individual businesses mentioned pooled their advertising budgets to facilitate a more effective use of cooperative media buying power.

(b) The businesses collectively belong to a merchants' association that executed a marketing outreach media program for its membership.

(c) A media campaign was initiated by the local Chamber of Commerce to promote area tourism.

The whole underpinning of the commission's sponsorship identification rule is to avoid listener confusion or misunderstanding as to who actually paid for the commercial(s). Standing alone, I agree with the commission that "[t]he two entities—businesses and chamber of commerce—are not obviously intertwined in the public mind."

Where I part company with the commission is on the severity of the forfeiture amount. Here Mr. Cole is probably correct in his theory that the FCC views such forfeitures as "money in the bank."

The truism of this regrettable incident is that station managers should be certain that continuity writers abundantly understand that proper sponsorship identification under commission rules cannot be an assumption of loose logic, but rather a commercial must unambiguously disclose from whom compensation was obtained.

James U. (Jim) Steele  
President/General Manager  
WKBX(FM) Kingsland, Ga.

## NEMO responses

Dear RW,

I'm writing in response to J.L. Sorenson's request for information regarding the origin of the acronym "NEMO" used in years past to denote a remote broadcast (RW, Dec. 22, 1993).

I became aware of the term about a dozen years ago while paging through a 1940s-vintage handbook of studio production practices. I too was curious to learn what the letters stood for, and questioned many colleagues through the years about their familiarity with the term. None ever provided an adequate explanation.

Last year, while reviewing a copy of Stanley R. Alten's excellent text "Audio in Media" (Wadsworth Publishing, Belmont, Calif., 1993, third edition), I discovered "NEMO" in the glossary (p. 605). Mr. Alten defines it as: "The acronym for Not Emanating Main Organization, the term used to indicate a remote broadcast."

On a related note, nostalgic RW readers may be interested in checking out the offer from Little Debbie's Snack Cakes

## Flying Into Trouble

Richard Smith, chief of the FCC's Field Operations Bureau, said "cooperation between the two agencies has improved" during an "FAA-FCC Workshop" at the 1993 NAB convention.

Smith's assessment was in spite of the fact that the Federal Aviation Administration official invited to the workshop failed to show up (RW, May 26, 1993).

At issue today, as it was last spring, is the FAA's 1990 computer model designed to predict interference to air navigation devices, which has blocked hundreds of FM broadcasters from moving or upgrading their transmission facilities, or has forced them to spend unforeseen additional capital to win FAA approval.

Broadcasters, with the support of the FCC, claim the model is based on irrational, worst-case scenarios, not reflecting the real world. After achieving "improved cooperation," the FCC convinced the FAA to revise of the model.

According to a status report to the NAB board released last month, the revision "has not resulted in a significant reduction in the blockages due to FAA involvement."

Also, in the NAB's best (albeit, admittedly biased) assessment, the situation could get worse. The FAA is planning to take full advantage of powers granted by Congress in 1987 to expand its regulation of communications facilities: "Assessment may reach beyond FM and TV and go to potential intermodulation and other interference from, for example, land mobile radio, certain common carrier facilities and AM radio."

David Letterman recently joked that his late-night TV show is "like an information superhighway without the information." An unleashed FAA could mean information without a highway, or at least gaping potholes in the wireless communications lanes.

Meanwhile, the FCC may decide to set standards for air navigation receivers, which it suspects may be uniformly low-quality and prone to interference.

The future may see broadcasters applying directly to the FAA for facilities changes and FCC field agents conducting surprise inspections of 747 air navigation systems.

Broadcasters certainly do not want to create life-threatening interference with aircraft, but the current direction of federal policy seems absurd. Hopefully, the FCC and FAA can improve cooperation further and work this out.

If not, broadcasters should be ready to lobby Congress to change the law again.

—RW

for a crystal radio kit, available by mail for \$5.95. The order form is reproduced on the rear panel of the company's peanut butter snack cakes.

I demonstrate the receiver to students of my radio history classes, who, by and large, are mostly unfamiliar with AM sets, particularly ones that work without batteries.

Bruce Mims, Department  
of Mass Communication  
Southeast Missouri State University  
Cape Girardeau, Mo.

## Legal matters

Dear RW,

Last July I read an ad in RW for a company called Radio Resources that read, "Turn your used equipment into cash." I had several conversations with Steve Scarborough at Radio Resources regarding the price of equipment I was looking for, mainly a used Potomac FIM-41 and Delta OIB-3 in good condition.

I had to sell something in order to buy what I needed, so we talked about equipment I had for sale. It turned out they were in immediate need of a DART-384 receiver for a customer and I had a very clean one which Steve offered to buy for \$4,000.

I agreed to the deal and placed an order with them for the equipment I needed. I shipped the receiver to Radio Resources on July 22, 1993.

On July 28, I received a credit memo showing a credit on my account of \$4,000 along with my order for the purchase of the FIM-41 for \$2,300 and the OIB-3 for \$1,400. The shipping costs would come out of the remaining \$300 and the balance would be sent to me or used as credit.

Radio Resources delivered an FIM-41

in August. There was a deep dent in the right side of the unit near the front where it had been hit very hard. The dents and scratches had been painted over, indicating the damage had been done prior to its being shipped to me. The detents in the switches were badly worn.

This equipment had seen many hard hours and its operation was intermittent at best.

I sent it back to Radio Resources with a note explaining all of this. Steve Scarborough wrote back promising to honor their satisfaction guarantee and send a replacement FIM-41 as soon as possible. A short time later Steve informed me that another FIM-41 was being shipped to me. I never received it.

After numerous promises of shipment had come and gone, I called Radio Resources and was told the equipment promised to me had been rented out due to a previous commitment. I didn't even receive the courtesy of a phone call.

Out of sheer frustration I finally asked them to send me a check for the \$4,000. I was told by Steve Scarborough on Oct. 20 that he would have it sent right away.

I have not heard from Radio Resources since. The check never arrived and I am now unable to get anyone from the company on the phone.

I have complete documentation of my claims and have turned the matter over the state attorney general's office. Radio Resources now says this was an "equipment trade" and that it will only send \$2,500, which they claim is the value of the equipment I was to receive from them.

By the way, Radio Resources never even tried to deliver the OIB-33.

Burt I. Warner  
Broadcast Technical Services  
Glendale, Calif.

# Radio World

Vol. 18, No. 3 February 9, 1994

Editor ..... Lucia Cobo  
Managing Editor ..... Randy Sukow  
News/Studio Sessions Editor ..... John Gatski  
Associate Editor ..... T. Carter Ross  
Contributors ..... Frank Beacham/N.Y.  
Bruce Ingram, Pamela Watkins, Nancy Reist  
Technical Editor ..... John Bisset  
Technical Advisor ..... Tom McGinley  
Editor (International) ..... Alan Carter  
Managing Editor (International) ..... Charles Taylor

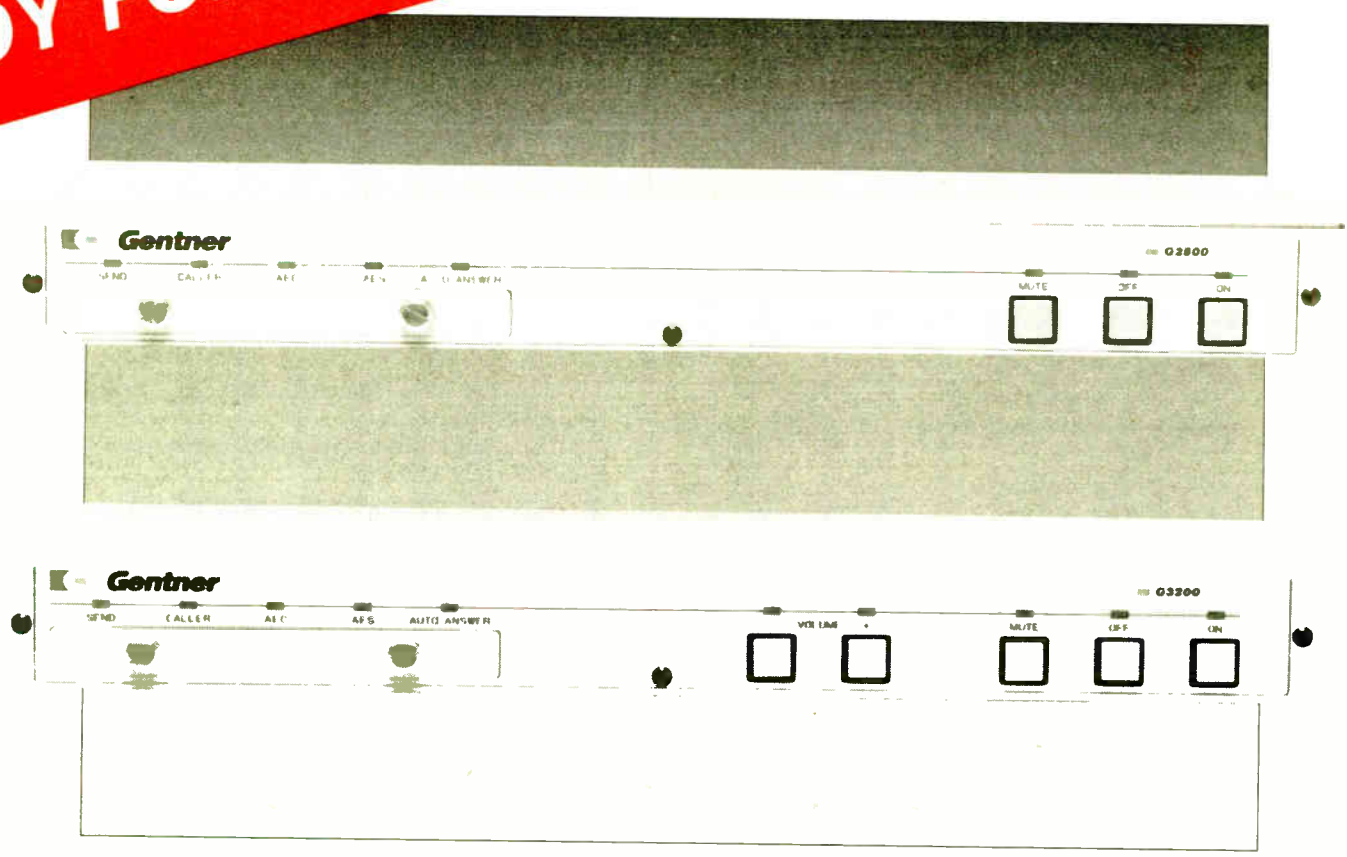
Radio World (ISSN: 0274-8541) is published bi-weekly by Industrial Marketing Advisory Services, Inc., 5827 Columbia Pike, Suite 310, Falls Church, VA 22041. Phone: 703-998-7600, Fax: 703-998-2966. Second-class postage rates are paid at Falls Church VA 22046 and additional mailing offices. POSTMASTER: Send 3579 forms and address changes to Radio World, P.O. Box 1214, Falls Church VA 22041. Copyright 1994 by Industrial Marketing Advisory Services, Inc. All rights reserved.

—PRINTED IN THE USA—

Next Issue of  
Radio World  
February 23, 1994



**IN STOCK NOW  
READY FOR IMMEDIATE DELIVERY**



# Superhybrids.

Improve your telephone audio with Gentner's new G2500 and G3200 digital hybrids. These "Superhybrids" provide the very best telephone audio quality. The same quality you've come to expect from Gentner.

Use the G2500 with any audio board or console. Unlike other hybrids available today, the G2500's Auto Mix Minus allows you the freedom to feed program output down the telephone line, even when the output contains caller audio. The G2500 automatically removes the caller audio from its feed path.

Take the G2500 anywhere you like. The automatic answer/disconnect, nulling, re-null on new line selection, RS-232 control, and single-cable conferencing with another G2500 lets you take it with you. And an acoustic echo suppressor further reduces the chance of feedback.

Designed for large talk shows or talk shows with a live audience, Gentner's G3200 combines both digital hybrid technology and digital acoustic echo cancellation to provide clean telephone audio. No matter how good the studio's room acoustics, some of the caller audio

appearing on the studio speakers will work its way back to the mics. The G3200 recognizes this caller audio and digitally subtracts it from its SEND audio path. The result is clean, intelligible audio on both sides of the telephone call. And you won't have to worry about volume—turn the studio speakers up as loud as you want.

If you need additional feedback control (for poor acoustic areas), use the G3200's Acoustic Echo Suppressor (AES). It acts as a reverse "caller control," suppressing send audio when the caller talks.

The same automatic

features as the G2500, plus a built-in auto mic mixer (up to 3 mics) and power amplifier, make the G3200 ideal for use in any talk show location.

Consistent and superior telephone audio, call after call.

## Gentner

Put Gentner's digital hybrid technology to work for you. Call the professionals at Harris Allied.

8:00 a.m. to 8:00 p.m. EST

1-800-622-0022

Fax 317-966-0623





# NAB Looks at Regulation, Technical Issues

by John Gatski

**WASHINGTON** In 1994, the National Association of Broadcasters (NAB) will examine a number of technical and regulatory issues affecting radio broadcasters.

In a just released report, titled "Broadcast Regulation, A Review of '93 and a Preview of '94," the NAB provides an overview and update of current issues affecting radio including digital audio broadcasting (DAB), AM improvement, spectrum, performance royalties, Emergency Broadcast System (EBS), RF radiation guidelines, and underground storage requirements. A paper, entitled "Legislative Issue Papers For the 103rd Congress, Second Session," also outlines legislative issues.

Many of the subjects in the report have been covered in *RW*, but others are updated.

## FAA/FCC tangle

One of the larger issues is the Federal Aviation Administration (FAA) and FCC conflict over perceived interference by FM stations to aeronautical communications. Besides its veto power over radio (or TV) towers being built too close to aircraft routes, the FAA has a say in any potential radio station interference to aircraft radios. This FAA power includes blocking TV or radio station modifications if they deem the action necessary. Broadcasters said that some of the FAA actions are unnecessary.

In 1990, the FAA created a computer model used to predict potential interference from radio broadcasts to aeronautical communications. The model was said to be more "real world" in its predictions than a previous version.

Continuing dialogues between the FAA and FCC have been on-going to resolve the conflict. The NAB said in its report, however, that "the revised computer program has not resulted in a significant

reduction in blockages (of new station or existing station upgrades) due to FAA involvement."

## Stricter standards

The NAB contends that aircraft radios need to have stricter performance standards to avoid interference. In 1993, the FCC proposed adopting technical standards for instrument landing systems and VHF omnirange radio aviation receivers. The NAB supports the move.

The NAB also wants the FCC to go beyond the adoption of the proposed receiver standards and enact regulations where "facility siting is based on substantiated engineering principles rather than on the phantom-based interference prediction model and assumptions employed by the FAA."

The FCC also should develop its own computer model for potential interference calculations, according to the NAB.

Other issues discussed in the NAB broadcast regulation report include:

- **DAB.** Currently, the NASA Lewis Research Center in Cleveland is testing transmission systems—selection of systems to be standardized is expected by 1995. The National Radio Systems Committee (NRSC) is guiding the testing of the in-band systems, which many broadcasters support.

- **Use of Old STLs.** In 1993, the FCC issued a proposed rulemaking that allowed radio stations to use old non-type accepted studio transmitter links (STL) as back ups when their type accepted equipment fails. This was initiated after the July 1, 1993 FCC rule requiring broadcasters to use type-accepted STLs went into effect.

The backup STL proposal, if approved, would permit use of old equipment for up to 720 cumulative hours per year. Stations are allowed to use the old STLs until the rule is approved, which is expected in the next few months.

- **Emergency Broadcast System (EBS).**

The FCC is considering technical changes for the EBS. Since the FCC new technologies field tests last year, the NAB has urged the FCC "to avoid EBS revisions that would impose undue new costs on broadcasters—especially radio broadcasters—at a time when the industry can least afford it."

## More comments

The NAB also has recommended that the FCC first issue a "tentative decision" before adopting a new technology. This tentative decision would lay out all the elements of the FCC's revised EBS plan and allow interested parties to file final comments before the actual changes are made.

The NAB also is closely watching several legislative issues for 1994. One that has not yet been resolved is proposed increases in fees for broadcast towers located on U.S. Forest Service land.

At one time, agency proposals called for as much as 1,000 percent increases in fees. Last year an advisory group of government officials recommended fee conditions that the NAB found acceptable:

- Separate fee schedules, not appraisals, for radio/TV broadcasters, based on metro rank and ADI.

- Thirty percent discount for radio and television sites users because of public service.

- Creation of a "footprint lease," in which the primary site user would manage all

other uses and pay the agency 25 percent of revenue.

Although the report met with tentative approval, the NAB said actual agency efforts have worked against it. In late 1993, a compromise plan called for no more than 10 percent increase in fees. More hearings are likely this spring, according to NAB.

FCC user fees are a foregone conclusion. Last year, the Congress approved a schedule for all FCC licensees, which takes effect in April. For radio stations, the user fees range from \$200 to \$900.

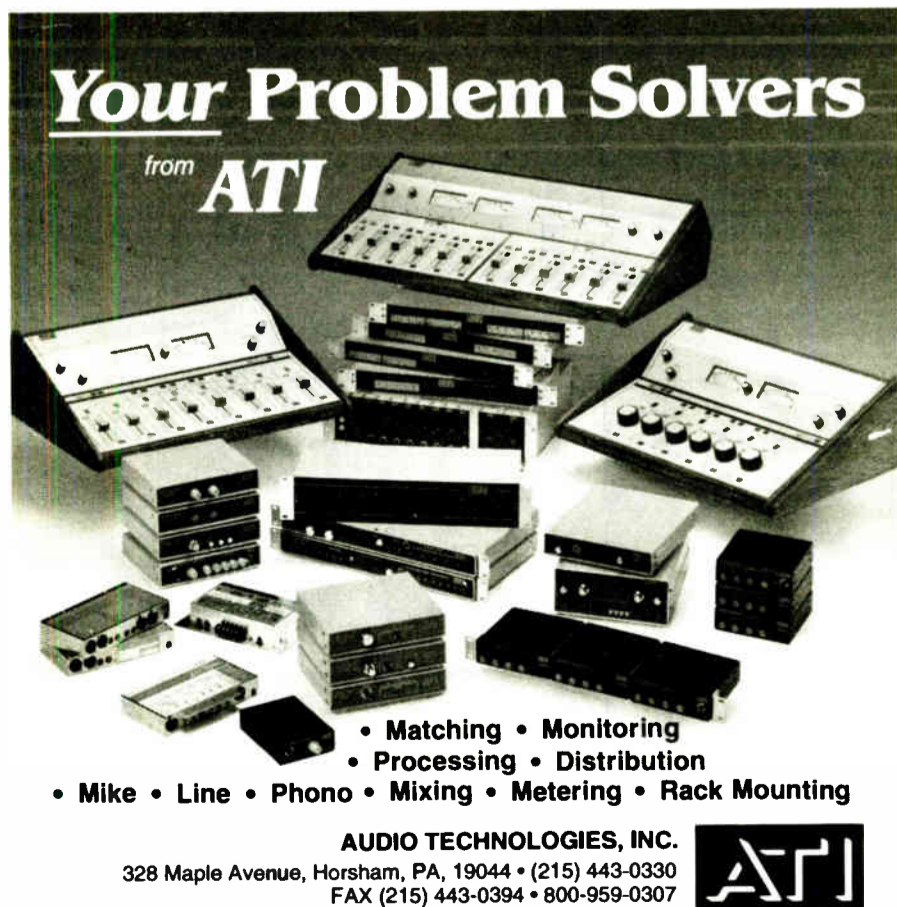
## Performance rights

A controversial issue that will accompany the advent of DAB is performance rights. In 1993, legislation was introduced that would allow performance and record companies the right to control digital transmission of their works, and lawmakers promised to make it a priority in 1994. Proponents said that a performance right law would bring the U.S. in line with other countries.

The NAB opposes performance rights, claiming that radio stations already pay copyright license fees. Also, recordings already benefit from "free advertising" when they are broadcast on radio, the NAB said.


Other 1994 legislative issues broadcasters will monitor in 1994 include radio ad disclosures, alcohol ad warnings and spectrum auctions.

**Your Problem Solvers**  
from **ATI**



- Matching • Monitoring
- Processing • Distribution
- Mike • Line • Phono • Mixing • Metering • Rack Mounting

**AUDIO TECHNOLOGIES, INC.**  
328 Maple Avenue, Horsham, PA, 19044 • (215) 443-0330  
FAX (215) 443-0394 • 800-959-0307



Circle (50) On Reader Service Card

A Broadcast Industry  
**BEST KEPT SECRET**

Mono Record Play  
**\$1290**

Stereo Record Play  
**\$1480**

F.O.B. Factory

Reliable / Rugged / Professional Design

- All Metal Housing with Cast Aluminum Front Panel
- Half Inch Thick Aluminum Deck with Stainless Steel Overlay
- Air-Damped Solenoid with Telfon™-Coated Plunger
- Direct-Drive Capstan Motor
- Three-Point Adjustable Head Mounts
- Input & Output Transformers
- CMOS Logic
- Straightforward / Serviceable Design
- Available as Dual Record/Play for Simultaneous Record or Cartridge Copy
- 30-Day Guarantee of Satisfaction / 1-Year Warranty



DL Series

**AUDI-CORD CORPORATION**

1845 West Hovey Avenue, Normal, Illinois 61761 USA  
Phone 309-452-9461 - Fax 309-452-0893

Available Through Your Regular Distributor

Circle (97) On Reader Service Card



# Pros, Cons of Workstation Use for News

by Bruce Bartlett  
with Jenny Bartlett

**ELKHART, Ind.** Is a two-track computer-based, digital audio editor a viable tool for news people trying to put together a story? Some users say yes; some say no.

To understand their points of view, first we need to know how the digital editing process works. Suppose you want to produce a spot, for example. You record three soundfiles onto hard disk: an unedited voice-over, sound effects, and a music bed.

Then, using a mouse and watching the waveform on screen, you edit mistakes out of the voice-over. Next, you put the sound

effects where you want them in the voice-over track. Finally, you set the music's level, and mix it with the edited voice-over. It's a cumulative mix, like sound-on-sound. You add new elements on top of previous mixes.

The computer will take some time to calculate the mix while you wait. The faster the computer, the faster the mix calculation. But in the end, it all works.

## Work for news?

But will such a system work well to assemble news stories? To find out, I talked with Bruce Schirmer, chief engineer of KGO Newstalk Radio in San Francisco, who has used two-track digital editors for news.

Bruce is enthusiastic about his digital editor, a CardD Systems from Digital Audio Labs. (There are other systems out there, most of them software-based including products from Turtle Beach, DigiDesign, Sonic Solutions and others.)

"It's perfect for a news station, and does a great deal for the money," Schirmer said of the Card Systems, a comment also echoed by users of other systems already in use. "Most people in our staff like it. "The two-track digital editor lets you produce a news story much faster," Schirmer said.

"With a digital editor, you can go back and undo any edit, or save 10 different

edits," Schirmer said. "The end product can be perfect. Also, the duration of each sound element shows on the screen, so it's easy to control overall timing. Another advantage is that digital access of sound bites is nearly instant, compared to slow access on a reel of tape."

The news edits you can do with digital also are much faster than analog, Schirmer added. For example, "You can quickly shorten a speech passage by taking out breaths. You can change the duration of certain sound elements by speeding them up or slowing them down slightly" (this also changes the pitch). It's possible to loop background noises, or to make a sound effect occur at several times by cutting and pasting."

As with any any machine nothing is perfect—even digital editors. Mary Ellen Geist, a field reporter for KGO, said a digital editor isn't always the best way to go—especially for stories on-the-fly.

"Digital editing is great for long-term series or stories that don't need to air right away," Geist said. "It's also good for cleaning up breath sounds and noises. So far, though, it's been too slow for quick turnaround news stories.

## Case in point

"Here's an example. Say you interviewed the mayor inside city hall. You record him on cassette. Then, as you head outside city hall, there's a protest against the mayor. You record the shouts and chants. Then you interview the protest spokesperson.

"You come inside the studio with your cassette, and feed the sound elements one at a time into the digital editor. And you need to record your own voice. So into the digital editor I feed my voice—the separate elements—such as, 'Today the mayor declared the city a nuclear-free zone.' Then I stop the digital recording. Then I put the mayor's voice in, then turn on my mic at the board, then say, 'But outside, protestors threatened a recall'—then feed the protest sound.

"The amount of switching I need to do this is ridiculous," Geist continued. "Also, I would rather announce live while playing the field recordings, to get a rhythm going. The timing between my voice and the field recordings is unnatural if I record them at separate times.

"You want the protestors underneath both voices—mayor and spokesperson. By the time you feed everything in and have the computer calculate the mix, about 20 minutes have gone by. But sometimes, I'll have less than a ten-minute turnaround."

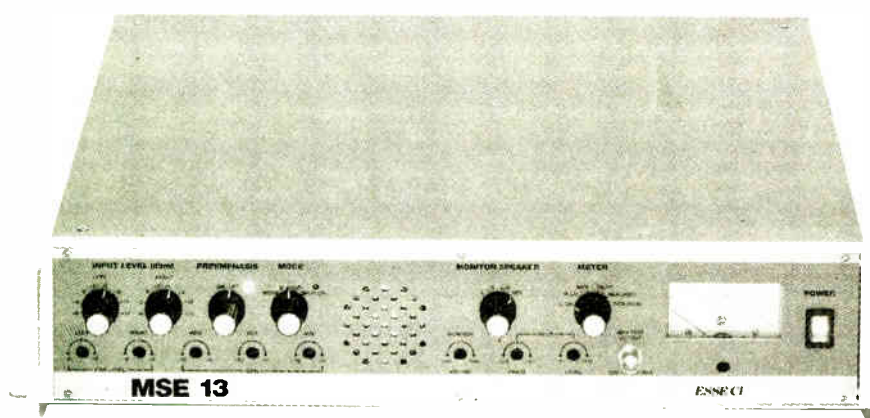
Geist's concern is legitimate, but not insurmountable. For one thing, not all that switching is necessary. You can first copy the cassette recordings non-stop onto disk, and drop markers for each event. Next record all the live announcements and drop markers. Then record the crowd noise into a separate soundfile. Define the parts you want to keep, and edit them together in order. Finally, mix the edited speech with the crowd-noise soundfile.

For quick turnaround news stories, however, it may be best to let the reporters use whatever method they prefer, according to news producers. They (the reporters) might work faster if they record the sound elements onto digital carts, then mix them live with voice onto a DAT or digital cart. The sound remains digital, and there's no wait for a mix calculation.

□ □ □

Bruce Bartlett is a microphone engineer and technical writer for Crown International. Jenny Bartlett is a technical writer.

# Simply perfect



## STEREO ENCODER MSE13

Professional Stereo Encoder, specially designed to comply with specifications of government broadcasting authorities and able to meet the requirements of professional broadcasting at any level.

It is not a chance that this apparatus shows characteristics which may not likely be found in other apparatus of same price: besides the indispensable RH and LH channel inputs, it features 3 fully independent auxiliary channels, 3 separate multiplex outputs and one pilot frequency synchronization output for a possible RDS generator.

Further technical data: S/N >90dB;

Distorsion <0,01%;

Audio passband 20Hz ÷ 15Hz ± 0,1dB;

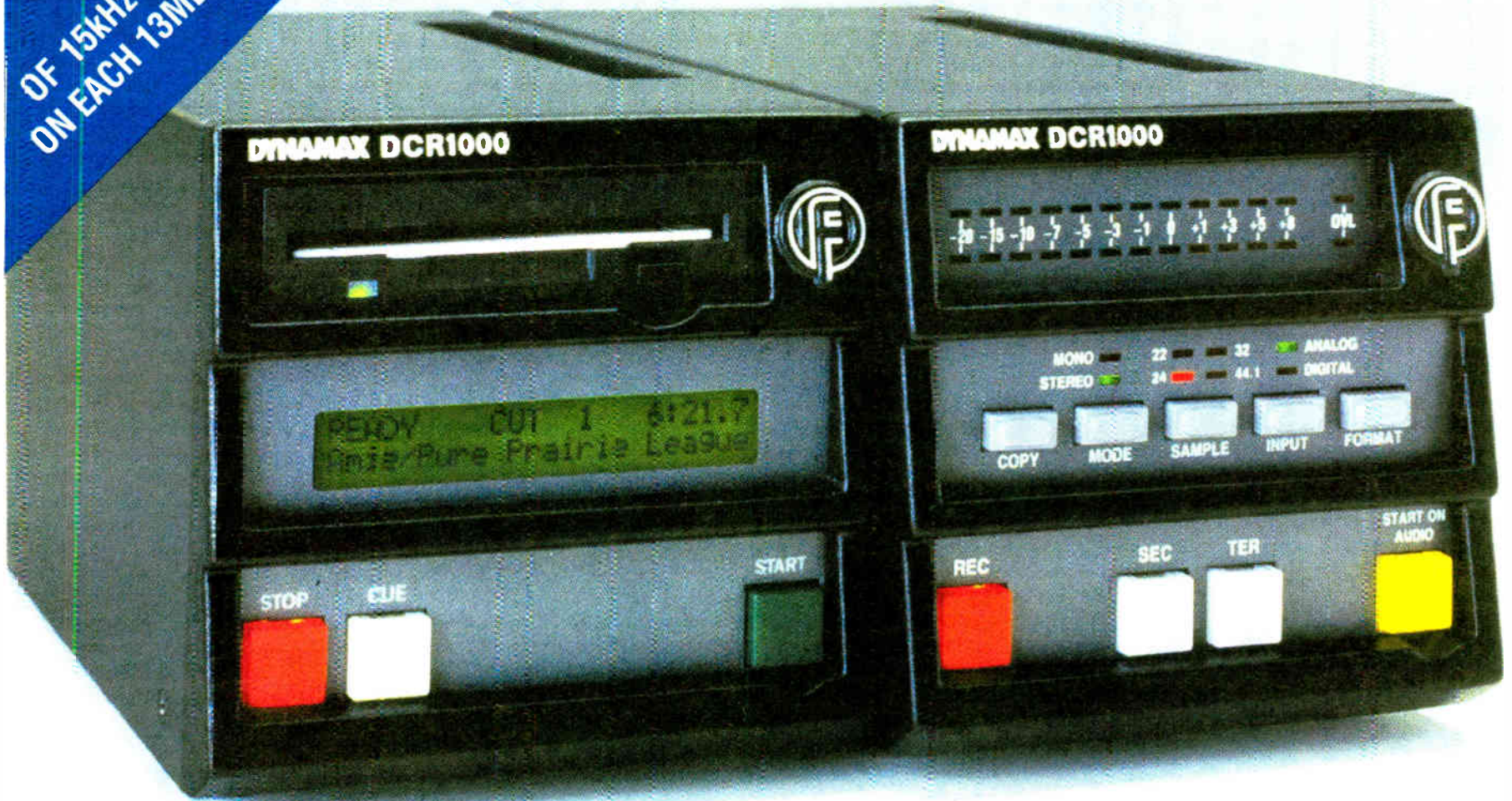
Crosstalk between channels >70dB.



SIEL Sistemi elettronici  
Via Bari, 26- 20143 MILANO- ITALY-  
tel. (+39-2)-89150150  
fax. (+39-2)-8136038



OVER  
5 MINUTES  
OF 15KHZ STEREO AUDIO  
ON EACH 13MB FLOPPY DISC



# The Dynamax DCR1000 with New Version 2.0 Software

**THE OBVIOUS DIGITAL SOLUTION TO CART MACHINE PLUG-IN REPLACEMENT**

## The Recorder

- Selectable sampling rates
- Secondary and Tertiary cues
- AES/EBU digital input
- Start on audio
- Direct digital dubbing from CD
- PC keyboard for titling
- Cut & paste editing
- Variable length beds
- Kill date checking
- Disk label printing

## The Reproducer

- Simple cart-like operation
- No on-air personality training
- Just three front panel buttons
- Instant start and cue
- Maintenance-free design
- Awesome audio quality
- Rotation & chaining
- Replay lockout
- Count-up/count-down timer
- RS232 logging/remote control

## The Media

- 13MB stores over 5 minutes stereo audio with 15kHz bandwidth and 15 minutes mono with 10kHz
- Standard low-cost 2MB floppy disk holds 60-second commercials
- Non destructive media diagnostic test

## New Year's Special!

**FREE Record Module with purchase of 3 players**

*Equipment Solutions To Keep You Number One*

**BSW**

BROADCAST SUPPLY WORLDWIDE

Toll Free 800-426-8434

Toll Free Fax 800-231-7055

7012 27th Street West Tacoma, Washington 98466

Circle (100) On Reader Service Card



# A 60 Second Look at the Last 25 Years in Commercial Radio.

*The DSE 7000.*

*The fastest  
digital  
workstation  
for radio  
production.*

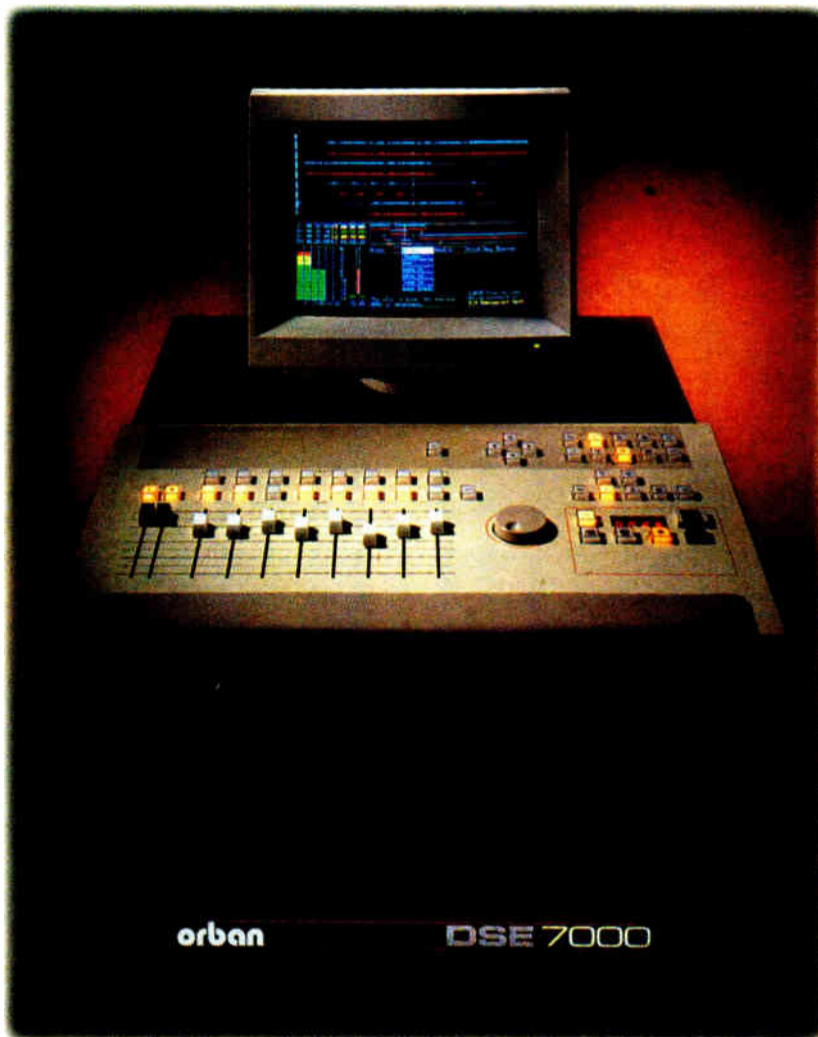
*Simplest to use.*

*And still the  
best way to get  
sixty seconds  
of history  
on the air.*

*Orban.*

*Celebrating*

*25 years  
in broadcast.*



*The Eagle has landed...New York  
State Thruway is closed, man...And  
Pepsi's got a lot to give...Wake Up,  
Maggie, I think I've got something to  
say to you...Peace is at hand...Bye, Bye,  
Miss American Pie...I am not a crook...  
I shot the sheriff...Plop Plop, Fizz Fizz...  
Tramps like us, baby we were born to...  
Hi, I'm Jimmy Carter...Ah, Ah, Ah, Ah  
Stayin' Alive, Stayin' Alive...No  
Nukes...Are you better off than you  
were four years ago?...Have a Coke  
and a smile...She's got, Bette Davis  
eyes...Where's the beef?...Beat it!...Beat  
it!...Four more years...What's love got to  
do with it?...Gorby! Gorby!...We are the  
world, we are...The ultimate driving  
machine...The Dow fell over 500 points  
today...I'm Tom Bodette for Motel  
Six...we'll leave the light on for ya...  
That's "potatoe" with an "E"....You got  
the right one baby, Uh Huh!*

There is just no faster way to slice through 25 years of radio, or your next sixty seconds, than the DSE 7000. *The New Speed Of Sound.*

**orban**<sup>®</sup>

**H** A Harman International Company

© 1994 AKG Acoustics, Inc. Orban and OPTIMOD are registered trademarks of AKG Acoustics, Inc.  
All other trademarks are property of their respective companies. 1525 Alvarado St., San Leandro, CA 94577 USA Phone 1•510•351•3500 Fax 1•510•351•0500.

Circle (183) On Reader Service Card

World Radio History



# Running Radio

The Do's and Don'ts  
of Radio Research  
See pp. 12-13

Your Resource for Business, Programming & Sales

## Dallas Hosts RAB Management Seminar

► continued from page 1

NAB's Fritts, will talk about the importance of a broadcaster's relationship with the government. His speech will cover radio auto leasing advertising, beer/wine disclaimers, political advertising and additional music performance payments.

Abel will take a futuristic look at new broadcast revenue opportunities created by digital technology. He will discuss RBDS, high speed data broadcasting applications, AM improvement, digital audio broadcasting and ways in which the telephone, cable and computer industries will affect radio broadcasting.

Noted inspirational speaker, Les Brown, will share his philosophies on turning dreams into actions in his keynote speech on Saturday, Feb. 19. Brown is well-known as one of the country's leading motivational orators and host of King World's "The Les Brown Show."

Named one of the top five speakers in the world by Toastmasters International, Brown's style also has earned him the highest award from the National Speaker's Association.

In addition to its full agenda of consultants sessions and workshops, RAB '94 will feature an "Urban Day" of special sessions dealing the urban format positioning, ratings research, selling tactics, qualitative research and other topics. Coordinators for the event are WGCI-

AM-FM Chicago's Darryl Green and WKYS-FM Washington's Jeffrey Myers.

RAB '94 also will feature "Hispanic Day," an entire day of special sessions for Hispanic-targeted stations, including discussions on research, promotions, co-ops, vendor and national representation.

The Executive Symposium (ES) is designed for general managers, group operators and owners. ES is a block of radio future-oriented programming and can be attended only by invitation. The symposium's focus is on high-level strategic planning for the future of radio.

The following is an abbreviated list of the Consultant's Workshops to be featured at RAB '94:

John Fellows of Giraffe Marketing— "Beyond OES: Building Sales and Customer Loyalty"

Don Benton of The Benton Group— "How to Sell Against Print"

Rhody Bosley of Bosley & Associates— "Designing a Sales Presentation That Really Sells"



Doug Cluff of Cluff & Co.— "How to Sell Long-Term Client Relationships"

Pam Lontos— "22 Tactics to Double Your Station's Business"

Norm Goldsmith— "You Are

Accountable...Are Your Sales People?"  
Rob Balon of the Benchmark Co.— "Power Research: Unleashing New Revenue Sources"

Jim Rhea— "Creating a Sustainable Advantage in the Marketplace"

Jason Jennings— "Achieving 100% Customer Satisfaction"

Kathryn Bidy Maguire— "How to Do a Local Vendor Program with a National Chain"

Calvin Dorsey— "New Money...New Money...New Money"

Jim Doyle of Top Performance Selling— "Lessons from America's Greatest Sales Managers"

Steven Downes of TeamRadio— "Even the Best Team Needs a Coach"

Jack Rattigan— "Have We Forgotten the Basics?"

Chris Stonick of Stonick Recruitment— "Radio Classified Advertising: The Non-Traditional Revenue Blueprint"

Darrell Solberg of DDS Sales Training— "Four Steps for Small Market Radio's Survival in the '90s"

Chris Lytle— "How to Stop Advertiser Turnover from Bleeding your Bottom Line"

Jay Mitchell— "Promotions That Work and How to Work Them"

Dave Gifford— "How to Get Your Unfair Share of Business"

Rod Rademacher— "Stop Giving Clients What They Ask for...Give Them What They Really Want"

Bob Weed— "Bigger Sales Through Professional Relationships"

Ted Price— "Risking Everything You Believe: The Fastest Way to Increase Billing"

## Walter Cronkite's Twentieth Century

A Daily Radio Broadcast.  
A Look Back At Significant Events  
on This Date In History

□□□

Delivery Via Satcom - C5  
All Barter

□□□

For Details Contact: David P. West

# 201-385-6566

Another Fine Radio Program From  
**Dick Brescia Associates**

DBA reserves the right of final selection of affiliates for any of its programs.

Circle (158) On Reader Service Card

## ATTENTION P.D.s

Schedule the best in "OLD-TIME RADIO" with

# When Radio Was...

Hosted by ART FLEMING, original star of "JEOPARDY"



Five shows per week—54 minutes each.

**BARTER, NO CASH PAYMENTS!**

Delivered via Satellite (SATCOM).

For more information contact David West at

**DICK BRESCIA ASSOCIATES (201) 385-6566**

When Radio Was celebrates its 4th year on 100 stations.

Circle (42) On Reader Service Card



# Use Research to Your Best Advantage

Part I of II

by Bob Steele

**FAIRFAX, Va.** The mere mention of the word *research* instills fear in even the most experienced broadcaster. However, it shouldn't. If you take the time to understand the basics, utilizing research effectively can be an easily surmountable task.

There have been hundreds of textbooks written and even

more courses taught on the subject of research. At every radio convention, there are seminars offered on the subject. Results of various Gallup surveys are available every day in newspapers like USA Today as well as your local ones.

In this article, I will outline some basic guidelines to help you get started on using research effectively.

When considering conducting a research project of any type there are a number of basic

questions you should ask.

Determine what type of research you are looking for. Are you looking to conduct

**Your budget determines, at the outset, the depth of the research project.**

music research to determine if your music presentation is on target for your audience? Are

you trying to determine your audience's or community's perception of your station? Are you interested in basic ratings-type research which can be used for both sales and programming?

Will you be conducting the research project in-house or will you be hiring an outside firm? This decision should be

based on whether your facility is equipped to handle the research task, i.e., Do you have

the proper equipment, staff and time needed? Consider whether you will get more accurate results by going outside and hiring a research consulting company.

What is your budget for the project? How much money can you (or will you) spend on the project? Although this may seem like an obvious question, it is important to be realistic in this area because an under-financed project can yield flawed data. Your budget determines, at the outset, the depth of the research project.

## Making a match

For the sake of brevity, I will assume you will be going outside the station to hire a research consulting firm. How do you go about finding the right company to match your needs? Your budget will play a major role in this decision.

As you would expect, the better-known research firms will likely be more expensive. Remember that cost does not always reflect quality.

You should interview a prospective research company as you would interview a prospective full-time employee. Ask for references, and check them! Word-of-mouth referrals from other station managers and the reputation of the research firm should be major factors in determining the right consultants for your station.

Many of the larger research firms advertise in the major trade magazines—so check there as well.

Ask the representative from the firm about other stations they have consulted. How fast will the data be turned around? How large will the sample size be for your market? The larger the sample size, the better the results. Beware, larger sample sizes mean increased costs.

How will the labor for the project be shared? Does the research firm do the entire project from start to finish or do station personnel do some of the work? Decisions in this area also can save you money if you have the qualified surplus staffing to handle the workload.

## Constant updates

As your research project is underway, do not be afraid to discuss it with your representative. You are paying for the project, so insist on weekly updates or regular status reports. While definitive data may not be available, you should be made aware of the ongoing status of the project. It is important to remember that under no circumstances should any changes be made to the station until the results and the conclusions drawn.

Incomplete research can yield inaccurate conclusions. You do not base major programming

continued on page 43 ►

# YOU CAN RELY ON LPB®

*Everyone knows the LPB Signature Series is the industry standard for rugged reliability. The LPB tradition of durable, reliable, easy-to-use consoles continues in our new linear fader consoles.*



With over 3,000 units in operation worldwide, the LPB Signature III console represents a standard others are still unable to match. The Signature Series has proved its ability to perform on 6 continents, in settings ranging from metropolitan to jungle. With an incredible record of ruggedness and easy maintenance, it's no wonder over half of the Signature console owners have more than one. Features include 3 inputs per channel, two output buses and plug-in electronics. LPB Signature III consoles are available in 6, 8, 10, and 12 channel stereo and 6, 8, and 10, channel mono models.

The LPB 7000 Series takes the standards of the Signature III a step further, adding more features than any other console in its price range. With front panel switches rated for 5,000,000 operations, gold contacts, plug-in modular electronics and more, the LPB 7000 Series has the durability radio and TV stations worldwide expect from LPB. Features include two inputs per channel, three stereo output buses with one mono-mixdown standard and two more optional, user configurable muting and remote starts, and much more. Available in 12 and 18 channel stereo models.



*It doesn't matter which LPB board you choose, you'll get a console you can count on 24 hours a day. One you'll keep for a long time. Ask any LPB console user — they're all around you.*

# LPB®

28 Bacton Hill Road • Frazer, PA 19355 • (215) 644-1123 • Fax (215) 644-8651

Circle (118) On Reader Service Card

World Radio History



# Learn the Fundamentals for Good Research

by Karl Baehr

**ALBUQUERQUE** This time out we'll talk about research at your radio station. Having had quite a bit of personal experience in this area, it is a topic I tend to be quite passionate about. I can also tell you from experience that concerning research, many stations are wasting their time, money and effort. So let's talk about research for a bit before we tear into the Top 10 list.

The bottom line regarding research is developing a valid purpose for the research to be done and a valid instrument for data gathering. If you do not have a specific purpose, and do not have a valid instrument for acquiring data, you are wasting your time.

A quick word about statistics: There is quite a bit of industry interest in statistical validity, accuracy, what's real and what isn't statistically. The fact is that, through accepted statistical means, you can produce just about any results you desire from just about any data set.

Another quick word about database marketing—be careful. If you assume that ZIP codes alone are indicative of listener or demographic profiles, you are wrong. Although ZIP codes alone are supposed to say a lot about you, many times they do not. For our Actual Radio Measurement service, we are implementing profiling by Census Tract and Block groups. This is a bit more indicative of demographic breakouts than ZIPs. You can get files for your market that will run on your computer for a few hundred bucks. These are the same files everyone uses, including us.

One last quick word about direct mail: Be ultra careful. How much "junk mail" do you get in an average week? Have you received sales pitches designed as surveys or contests or priority/overnight mail? Then maybe it has the same effect on you

as it does on me: it irks me to no end. Use your head. Be straight forward in your presentation and your results will be more realistic. Let's get into it...

*Ten things you can do right now to improve your station's research:*

- Define the purpose of the research. Is it to get a gauge on programming? Community awareness? Audience composition and location? Why are you going to perform this research? Specify the goals of

## Develop a purpose for the research to be done and an instrument for data gathering.

the research to be performed.

- Determine a research method. How will you get the information to address the purpose defined in step 1? Phone calls? Questionnaire? Observation?

- Decide who and from where you want to obtain information. Whom or what do you want to be able to draw conclusions about? Who will be observed for what purpose?

- Design an effective instrument for data gathering. If a questionnaire is involved, remember that a poorly constructed questionnaire can lead respondents to miss questions, become confused and, in the extreme, may even cause a few to hang up or throw away the questionnaire.

- Devise an effective means of maintaining the integrity of the data gathering process. If you have a room full of interns playing music clips to people over the phone, good luck. Who will be in charge or overseeing the process? Why is that person qualified? What are the safeguards and spot checks?

- Collect your data. This can be over the course of a week, a month, or an inter-

rupted time series. It could be a continuous process. How much and how often data is collected will be largely determined by what your initial purpose is.

- Process your data. Transform your collected data into a form appropriate for analysis. Don't sit down and plow through a pile of call-out sheets or surveys and hope to determine results; you are not there yet. Compile the data in a form for analysis and discussion.

- Now you are there. Analyze the data you collected, and draw conclusions. What does all this stuff mean? Why? What does it indicate, a change in market trends or conditions? A positive trend in our programming? Discuss all aspects of the data collected.

- Apply what you have found to your station. Now it is time to put to use what you have learned. If you have defined a purpose for your research, designed and implemented a valid means of data gathering, objectively analyzed that data, you now have valuable information in your hands, use it!

- Understand that research does not have to be expensive to maintain, but can be invaluable to your station. Ongoing, quality research can provide you with unique insight into your market and your audience. If maintained properly, it will provide you with an edge the other guys could only wish for.

*Here are a few quick ideas for ongoing research projects at your station:*

- Each month arm your sales people with a few questions to ask of local businesses. No more than three easy to answer questions. These questions can be related to their business, the community or perception of your station and can ultimately help you develop a profile persona of

businesses in your community.

- If you do call out research, keep it short and simple. Be mindful of when you call and be sure you train your telephone operators how to present themselves. You can get enough qualified information from somebody in 90 seconds to help you achieve just about any specific purpose. You cannot expect to keep somebody on the phone for five or 10 minutes answering questions at dinnertime or at the end of a long workday.

- Polling callers to your station is okay, but keep it short. Where did you hear about us? Where are you calling from? What do you like/dislike about the station? Why do you listen to us as opposed to W---? "Opinion seeker" phone lines are a good way of getting response to community related issues, and providing actualities for on air use. But don't misconstrue these responses with the overall perception in your market though, as it is estimated that only about 8 percent of your actual audience is telephone active.

There are several good resources available to you with regards to the purpose of research and research design. A good base reference text is *The Practice of Social Research* by Earl Babbie. It is pretty heady stuff, but it covers just about everything in the way of conceptualizing and designing research as well as covering purposes, methods and analysis.

Contact a local university for help in designing effective research projects, and perhaps maintaining them through an internship program with the university.

□ □ □

*Karl Baehr is president of KBE "Broadcasting By Design," a radio consulting firm providing support services for satellite radio stations and produces the Actual Radio Measurement (ARM) electronic survey system. He can be reached at 505-828-0488; or fax: 505-821-4226.*

## MOVING?...

Don't leave us behind!

Mail or fax your current label and new address (with effective date) to:

Circulation, RW,  
PO Box 1214  
Falls Church, VA 22041  
or FAX 703-998-2966.

Address changes will be processed within four weeks of receipt.

Thanks!



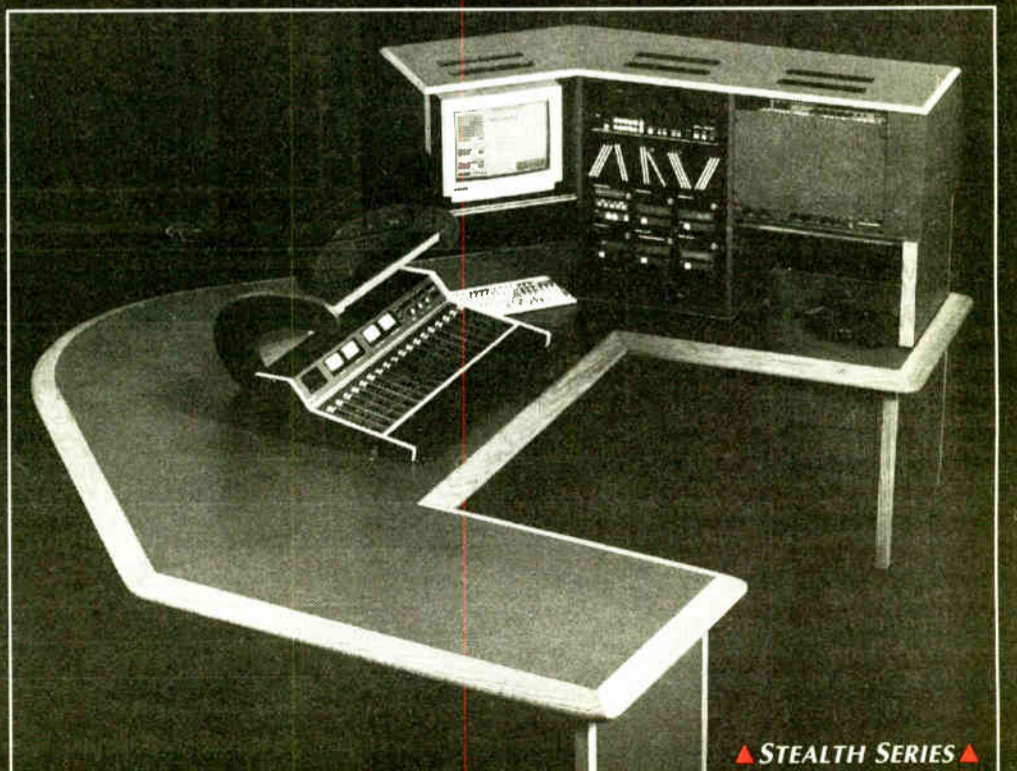
## THE SECRET'S OUT—DIGITAL FURNITURE

MODULAR  
FLEXIBILITY  
WITH A  
CUSTOM FIT

We Offer Six Elegant  
Lines of Studio Furniture

4153 BONITA STREET  
SPRING VALLEY, CA 91977  
PHONE 619/698-4658  
FAX 619/698-1268

**MURPHY**  
STUDIO FURNITURE



▲ STEALTH SERIES ▲

Circle (77) On Reader Service Card



TECH TALK

# A Progress Report on Digital Radio

by Judith Gross

**NEW YORK** How concerned do we need to be about the timetable for DAB? The question comes up less frequently these days than at many other memorable points in the past four years.

Controversy over systems has abated and by now, the five proponents participating in the EIA tests have systems residing at NASA's Lewis Research Center in Cleveland, poised for the actual test phase to begin.

But ever since the radio industry entered its current phase of accelerated

buying and selling of stations in quest of the perfect LMA or duopoly (a healthy economic sign, to be sure) those on both sides of a financial deal have had to factor in the looming specter of DAB whenever negotiations began.

The question is as critical to consumer electronics companies as it is to owners or would-be owners of stations—speaking to the questions of budgeting for new equipment, making obsolete old and gearing up for new markets.

The concerns can be summed up in a few concise questions: How soon? Which system(s)? What requirements

will there be to switch to digital broadcasting?

**The test calendar**

The EIA committee testing DAB systems has set up an efficient timetable for lab testing in Cleveland and at last glance it seemed that the participants were having no trouble adhering to the deadlines of the plan. The participants are: Eureka-147, USA Digital with both AM and FM systems, AT&T, Amati and NASA, which is testing a satellite DAB system. Equipment was set for arrival by mid to late January, with February slated

for the firing up and preliminary operation of systems in and obtaining samples to be used for the actual tests.

By the time the industry gathers in Las Vegas for NAB '94, the tests themselves are set to begin, and continue until the end of August. Of course, it's rare for any test schedule to run like clockwork.

While tests proceed in Cleveland, double-blind listening tests also will be taking place at the Communications Research Center up in Ottawa.

The EIA's aim is to complete a report on the tests by March 1995, but there's more to consider. The working group on DAB was just beginning in early February to consider how to go about field testing the systems.

And that's when it's really going to get interesting—there are vast differences among the systems: in-band on-channel, in-band adjacent-channel, L-band and satellite. How can they be tested comparably? How do we compare apples to oranges to pears to bagels? And for the purposes of planning, how long is it all going to take? It seems a safe bet that with the lab tests going until the end of the summer, field tests will take us safely into 1995.

Now add the timing of reports, industry debate and regulatory action, and we're looking at the latter part of 1995. And that's being optimistic about the timetable.

**IBOC or what?**

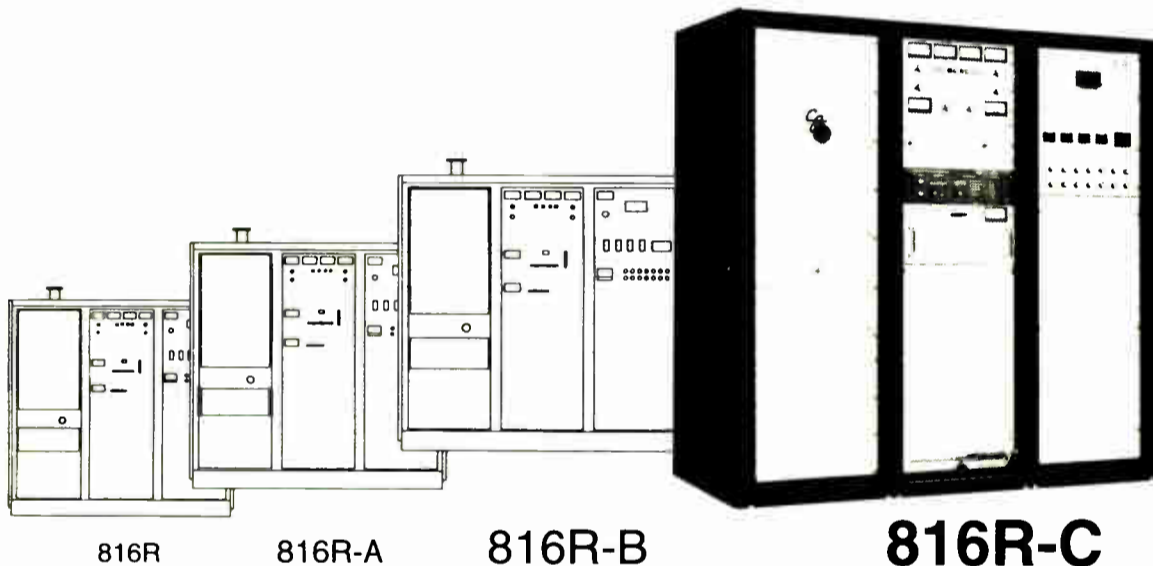
Once the testing phase is through, questions about what's going to happen with regards to DAB are far from over. Consider the possibilities just emerging from the tests. All systems could perform equally well. Some may perform better than others. Eureka, having undergone extensive tests prior to the EIA's plan, may be the only system that performs acceptably. Then what?

The industry is firmly lined up in support of in-band on-channel for both AM

continued on page 33 ▶

## EVOLUTION OF DESIGN

*"The Best Is Now Even Better"*



### New Continental 816R-C Series FM Transmitters 21.5kW 25kW 27.5kW 30kW 35kW

They may look alike . . . but each generation 816R is a landmark design enhancement. We keep those qualities that make this the World's most reliable, high performance transmitter. We make changes only where new technology improves the performance and dependability of the 816R.

**WHAT'S THE SAME:**

- Self Neutralized 1/4 Wave Cavity
- Exclusive Solid-State Softstart™
- Self-Contained\* in Single Cabinet
- Built-in Filament Voltage Regulator
- No External Harmonic Filter
- Positive Air Pressure Cabinet
- Continental's Two Year Warranty

\*Separate HV Power Supply in 35kW

**WHAT'S NEW:**

- New Digital Synthesized 802B Exciter
- Solid State IPA In Roll Out Drawer
- All PC Cards Now in Front Panel
- Complete Power Supply Access
- Improved Metering Positions
- Designed for Ease of Maintenance
- New Continental Colors



**Continental Electronics Corporation**

P. O. BOX 270879 DALLAS, TEXAS 75227-0879 214-381-7161 TELEX: 73-398 FAX: 214-381-4949

**Estimated Timetable For U.S. DAB Service**

**Early January-Mid March 1994**

Arrival of DAB systems, initial operations and audio samples obtained

**Mid-March—Late August 1994**

Lab tests and expert listening tests of all systems

**September 1994—Early 1995**

Field testing of systems, evaluation of lab and listening tests

**Spring 1995**

Report from EIA on lab tests

**Summer 1995**

Report (if any) on field tests

**Fall 1995**

Industry debate, petitions for rulemaking

**Late 1995**

Rulemaking proposed

**Early 1996**

DAB standard adopted

**Mid 1996**

Terrestrial DAB service, concurrent with existing analog service, begins in U.S.



# Model SM-1 AM Splatter Monitor



## Features

- Inexpensive means of verifying FCC compliance
- Easy to operate and interpret measured results
- Measurement of I, Q, I+Q (chopped) and external audio signals
- 450 kHz to 1800 kHz phase-locked operation with 10 kHz or optional 9 kHz channel spacing
- Portable operation from external 12 VDC supply and optional active antenna for near field signal monitoring
- Quadrature modulation measurement enables transmitter adjustments for minimum IPM
- External audio input enables evaluation of audio processor's NRSC filter performance
- Optional peak hold circuit
- Optional spectrum analyzer 300 Hz resolution bandwidth model filter assembly
- Front panel speaker and headphone jack permit audible monitoring of interference
- Adjustable alarm output permits remote control monitoring of interference
- Rear panel I and Q outputs and buffered meter output

The Model SM-1 Splatter Monitor provides AM broadcast engineers with a means of accurately and easily measuring off-channel emissions to ensure compliance with the FCC (NRSC-2) emissions standard. Manufactured in response to the recommendations of the National Radio Systems Committee (NRSC) for AM improvement, the instrument provides many of the features of an expensive spectrum analyzer at a significantly reduced price. The Splatter Monitor measures the level of splatter or any other spurious emissions which fall between 11 kHz and 100 kHz away from both sides of the carrier.

The Splatter Monitor provides both fixed and portable operation. While normally installed in an equipment rack and fed with the transmitter or common point RF sample, it also operates in the field from a twelve volt DC source. An optional active antenna then provides the RF sample. This portability is very useful for investigating interference complaints.

**DELTA ELECTRONICS**



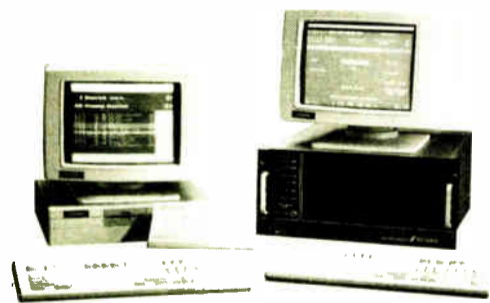
**1-800-8-DELTA-8**  
Telephone 703-354-3350  
Fax: 703-354-0216

Delta Electronics, Inc.  
5730 General Washington Drive  
Alexandria, VA 22312





The cart machine was an innovation in its time. That time is past. The future is digital with AUDISK.



AUDISK is a user-friendly system that replaces carts and cart machines with high quality digital audio.

No more stacks of tapes all over your control room. No

labeling mishaps. No out-dated spots airing. No need for mass erasing sessions or buying new tape and carts.

Sound complex and expensive? It's not.

The AUDISK system is simple to operate and can pay for itself in a matter of months, no matter what your format.

You've probably been thinking of making the move to digital but aren't sure which system is best for your station. We urge you to take a look at AUDISK. It's a complete digital

system. One price puts you light years ahead of the old tape cart days and ahead of other digital systems.

With AUDISK you don't have to pay for a lot of extras to get the job done. Whether you're looking for a cart machine replacement, live assist, complete automation or even an uplink facility, AUDISK is the right product at the right price.

Some systems charge you for every feature. They're included with AUDISK. Need two points of control from a single system? No problem with AUDISK. Want to run an AM/FM production room from

the same system? That's no problem either.

From the AUDISK DS100 to the DS2002 system, all are expandable and upgradeable to meet your specific needs.

Move your station's profitability far into the future with AUDISK. Make one toll-free call and start packing up those old cart machines and tapes.

AUDISK is the future of radio technology brought to you exclusively by the broadcast digital audio pros at Harris Allied.

**8:00 a.m. to 8:00 p.m. EST**  
**1-800-622-0022**  
**Fax 317-966-0623**

 **HARRIS**  
**ALLIED**





USAirplay

# Radio Plays Immediate, Crucial Role

by Charles Taylor

**WASHINGTON** The snow may be piling up inch by inch outside my office window, but **Radio World** is on deadline and it's clear to most of us here that we don't leave until the last comma is in place.

While my desk-side radio usually offers a continual low-level drone of music, today the airwaves took on an alternative role, becoming a near necessity in the lives of those who have any intention of being someplace else at any point in the near future.

Road conditions, event cancellations and continual weather updates all took precedence over radio's traditional role as an entertainment and amusement resource in my life. Even the FM dial, traditionally light on information in

lieu of music, picked up in its capacity of maintaining a steady flow of public service-oriented programming.

There is, in fact, no other medium that can provide such valuable information with the immediacy and convenience of radio.

## Information provider

Of course, a broader example is the Los Angeles earthquake just last month. With widespread power outages and thousands in need of relevant information, battery-operated radios provided many with the only clues available. In some cases, even network television depended on radio stations for reports where TV crews lacked power.

Likewise, when severe flooding last summer left much of the midwestern U.S. with few resources, local radio stations fought the elements to stay on the air—or in some cases return to the air—offering information on assistance, road and weather conditions and providing a link to those isolated or concerned about those in nearby communities.

In many instances, television was inaccessible to those whose homes were buried to the rafters under flood waters, but radio was obtainable in its simplest hand-held transistor form. In some situations, people's lives depended on the information obtained from their radios.

In January 1991, when the coalition of U.S.-led forces launched an air war against Iraq, America's collective ear was glued to the radio at the office, in the car, in department stores—anywhere there wasn't access to television and CNN. It was a sobering time when every station,

from country to R&B to top 40, became a consistent information provider. Most stations offered hourly updates on the war—even outlets that traditionally only broadcast news during drive times.

Surveys revealed that overall radio

listening actually increased nationwide during the crisis period, particularly among news/talk formatted stations.

I remember many years ago as a reporter for my hometown newspaper, I was sent to cover a major blaze at a historic church. As I made my way to the scene, one local radio station covering the tragedy advised motorists to reroute around closed roadways.

The event wasn't significant enough to interrupt nighttime network television programming; however, in an instant, radio was there with the action. Those broadcasts had a direct effect on my ability to do my job: I avoided certain streets and was able to make it to the fire with much more ease and cover my assignment in the "heat" of the phenomenon.

## The initial link

In this case, radio's bearing on me had the more impacting influence of allowing me to offer a better story for thousands of readers in the morning paper (mind you, for those who hadn't already heard about it on the radio or late-night news).

Around the world, radio often provides the initial link to global events, from natural disasters to wars to the demise of our heroes. It offers a trustworthy and instantaneous voice in our communities, from the ground-breaking decision at a county government meeting to the high school football team winning the regional pennant to weather details at dawn that farmers might count on to keep the crops thriving.

In my own daily routine, news comes not from the newspaper—I don't see it until I get to work—but from the morning broadcast on my favorite station B101.5 (WBQB-FM Fredericksburg, Va.), which I hear from the shower. At least when I leave the house, I have enough knowledge to know whether or not the sky is scheduled to fall that day.

In good and bad, amid triumph and defeat, radio is always there. Never simply take it as something to sing along with. Often, it's a link that keeps the world turning.

# Radio Outlook Is Good

by Whitney Pinion

**NEW YORK** Revenues of publicly reporting radio stations rebounded in 1992 after a recession and decreased advertising spending sent the industry sliding between 1989 and 1991.

According to the Veronis, Suhler & Associates 1993 Communications Industry Report, radio broadcasters saw revenues of \$831.5 million in 1992, an increase of 9.2 percent over 1991.

The authors of the report attribute this growth to a number of factors. The talk show format on radio stations proved tremendously successful in 1992, as listeners called in to voice their opinions or ask for advice. Much of the talk revolved around the presidential race and election, which added dollars to radio's pot with campaign spots.

Radio, like other industries, felt the economic forces of the late 1980s. Because of debt incurred throughout the 1980s and a tapering off of profits, companies were forced to pare down, and spending on advertising was sheared as a part of this process. The first year of the 1990's decade was especially sluggish, as coverage of the Persian Gulf War in early 1991 cut advertising time and subsequent revenue.

Broadcasters responded to the weak advertising environment by restructuring their own operations and cutting costs. As a result, the report said, broadcasters saw their earnings and margins rise substantially once advertising revenues picked up in 1992. The average

operating income margin in 1992 was 17.2 percent, up 3.9 points from 1991. Recovering from the dramatic declines of the previous three years proved to be a challenge, however; the 1992 operating income margin was still 2.5 points lower than in 1988.

These figures point to the fact that, although there was a burst of popularity in 1992, radio listening has been declining at a slow but steady rate. The focus of this decline in listenership is the home, where cable and home video have come to occupy more and more leisure time.

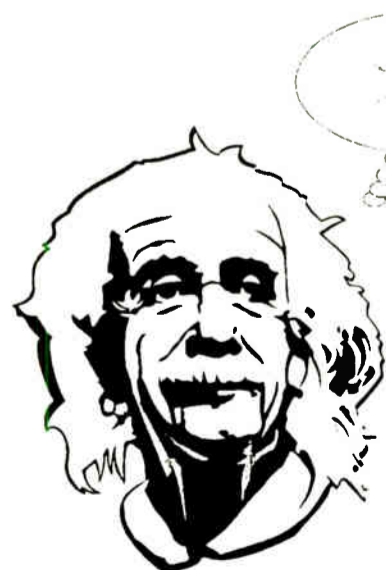
The authors of the report predict that once the growth of cable and VCR penetration levels off, declines in in-home listening should moderate and that overall radio listening should stabilize.

What is interesting to note is that while in-home listenership has fallen, according to the report, radio has experienced continued listening gains outside the home.

Local advertising should continue to generate the majority of revenue for radio stations. Local ads accounted for 79 percent of radio's revenue in 1988 and climbed to 81 percent in 1992. Radio stations should also benefit as internal restructuring is completed and as the rate of economic growth improves as expected.

The report said that network radio advertising is expected to rise from \$424 million in 1992 to an estimated \$550 million by 1997. Radio advertising, as a whole, will total \$12.0 billion by 1997, compared to the \$8.6 billion of 1992.

**In some cases, even network television depended on radio stations for reports where TV crews lacked power.**



# Did you know?

**Broadcast CD Libraries: 1100 cuts \$2495.00**

**Weekly CD Top Hits U.S.A. - \$16.95/week**

**Format Services - \$295.00 per month**

It doesn't take a genius to recognize a great deal. RPM has a library of 6,000+ cuts digitally remastered for superb on-air quality. We also offer on-time weekly CD hits. Best of all, our services are priced for the 90's. Call for our catalog listing all 6,000 cuts and a sample disc. We're in our 25th year of serving broadcasters and we'd like to work for you.



**rpm** RADIO PROGRAMMING AND MANAGEMENT, INC.

**50 States & Canada: 800-521-2537**  
**Over 1700 clients Worldwide!**

Fax: 810-681-3936

Top Hits U.S.A. and Ultrasonic-Q Radio Disc are trademarks of Radio Programming and Management, Inc., 4198 Orchard Lake Road, Orchard Lake, Michigan 48323. The Ultrasonic-Q system is Patented.

Circle (181) On Reader Service Card

World Radio History



# STATION SERVICES

News and Services for Business, Programming and Sales

## Live Satellite Country Network

**BRANSON, Mo.** The Branson Country Music Network offers a "live satellite-delivered" country music format.

The format is available to radio stations across the U.S., 24 hours a day, with live personalities and special appearances by major country music stars on a regular basis. The music is an even blend of hot new country singles and classic country songs.

The Branson Country Music Network uses the latest in digital satellite uplinks and state-of-the-art digital studios, allowing the network to provide services, including exact time, weather and news.

For information, contact Doug Raines in Missouri at 800-680-2261; fax: 417-335-2377; or circle **Reader Service 21**.

## On Travel Radio Features Ireland

**LOS ANGELES** On Travel Radio offers radio listeners the chance to explore the Irish countryside in time for St. Patrick's Day with the special "On Ireland."

Hosted by travel journalists Paul Lasley and Elizabeth Harryman, the program introduces travelers to Ireland's scenery, personalities, music and culture.

On Travel Radio is syndicated by Media-Star International and produced by Radio Today in conjunction with Leone & Leone Ltd.

For information, contact Jennifer Forrest in California at 714-493-7988; fax: 714-493-6977; or circle **Reader Service 200**.

## First Female National Talk Team

**ARLINGTON, Va.** Westwood One added "The Brooke Daniels and Roberta Gale Show" to its national talk programming roster. The show airs weekdays from 9 a.m. to noon EST.

Daniels' and Gale's show is geared

toward FM radio stations and entertainment-oriented AM stations. They explore a wide range of issue-oriented topics—from what is happening in the news to what may or may not be happening in their bedrooms—in an intelligent, but raucous fashion. Although it is the first female talk show team to go national, Westwood One stresses that the show appeals to men and women equally.

Listeners are able to call into the show via a toll-free number.

Daniels and Gale join Westwood One from WKXW(FM) in New Jersey.

For information, contact Laurie Peters in California at 310-840-4383; fax: 310-840-4068; or circle **Reader Service 159**.

## Race Cars on Radio

**TAMPA, Fla.** The International Motor Sports Association (IMSA) and Paxson Broadcasting have formed the IMSA Radio Network for the 1994 racing season.

The IMSA Radio Network will broadcast nine races in 1994, including 12 hours of the Sebring International Grand Prix of Endurance from Sebring International Raceway in Florida, March 19; Road Atlanta from Georgia, April 17; Lime Rock Park from Lakeville, Conn., May 30; the Glen Continental XI from Watkins Glen International in New York, June 26; Laguna Seca Raceway in Monterey, Calif., July 24; Portland International Raceway in Oregon, July 31, and Phoenix International Raceway in Arizona, October 1. Two additional races are to be announced.

For information, contact Rick Green in Florida at 407-661-1900; or circle **Reader Service 83**.

## Low-Cost Broadcast Newswire

**DES MOINES, Iowa** Learfield Data is an inexpensive alternative to traditional broadcast newswire services.

Learfield Data allows subscribers to choose and pay only for the information they need. Subscribers choose from a

menu of services that includes news, weather, sports, entertainment, agriculture, features and more.

The data is delivered to radio stations via Ku-band satellite, and stations are supplied with all of the necessary equipment. Helping to distribute Learfield Data is the satellite network Broadcast Partners.

For information, contact Steve Mays in Massachusetts at 314-893-7200; or circle **Reader Service 29**.

## Free Public Affairs Programs

**SALT LAKE CITY** The Church of Jesus Christ of Latter-day Saints offers "Times and Seasons," a series of 30-minute, documentary-style public affairs programs dealing with timely moral and social issues.

Topics covered in the series include tobacco, youth and alcohol, voluntarism, aging and the elderly, drinking and driving, the free press, addiction, parenting, child abuse and religion.

The series enables stations to easily address significant community issues for the Quarterly Issues/Programs List as required by the FCC.

For information, contact Don Russell in Utah at 800-453-3860, ext. 4397; or circle **Reader Service 98**.

## Live Progressive Music

**ST. LOUIS, Mo.** The Post Modern Radio Network (PMRN) entered a sponsorship agreement with Anheuser-Busch to bring radio stations the best of modern/alternative music.

Recent live acoustic performances on PMRN include The Ocean Blue, Kirsty MacColl, Aimee Mann, The Judybats, Best Kissers in the World and dada.

For information, contact John Soltys in Missouri at 800-737-9099; fax: 314-394-6515; or circle **Reader Service 134**.

## Radio Infomercials

**SAN FRANCISCO** Quorum Studios is now producing infomercials for radio. Each 28-minute infomercial has the

sound and feel of a radio talk show, complete with interviews and call-ins.

Individual infomercials are licensed on an exclusive market-to-market basis, with air date and time up to station management.

Station responsibility is limited to airing the show. Product manufacturing, packaging, order taking, shipping and handling and customer service is all handled by the sponsor.

For information, contact Douglas Chew in California at 510-531-2404; fax: 510-531-2404; or circle **Reader Service 119**.

## InfoRadio Network Launched

**CULVER CITY, Calif.** IDB Broadcast debuted the InfoRadio Network, an ad hoc network of radio stations that broadcast InfoRadio direct response programming and share in the revenue from sales of products and services.

InfoRadio is distributed free-of-charge to affiliates via SATCOM C-5, transponder 19, on a 15 kHz channel. Affiliates agree to air programming in "unsold" times throughout the day. IDB collects monies from the consumers who call in using the toll-free line.

For more information, contact IDB at 213-870-9000; fax: 213-240-3901; or circle **Reader Service 90**.

## DIY Home Improvement

**LOS ANGELES** "Welcome Home to Around the House" is a two-hour talk program concerning home improvement, design and repair. It is broadcast every Saturday morning from 10 a.m. to noon EST on the American Forum Network.

Hosted by interior design experts Barry Jaquess and Rene Weston, the show blends home repair and improvement with cost-effective design advice, new home products, gardening and hints on improving property values. Listeners are invited to call in to the show.

For information, contact Barry Jaquess in California at 213-466-5996; fax: 213-463-8382; or circle **Reader Service 189**.

# STATION SERVICES

427 SOUND EFFECTS  
\$89.00

For a 5-CD set with a 30-day money-back guarantee.

Take an extra \$10 off if you mention this ad!

Send \$79 to Ghostwriters  
2412 Unity Ave. N., Dept. RW  
Minneapolis, MN 55422

For credit card orders call  
(612) 522-6256

READER SERVICE 102

## BUY - OUT MUSIC

•Industrial •Technical •Logos  
•Dramatic •Romantic •Variety  
•Contemporary •Sports •Travel

11 Great Volumes! Low Buyout Pricing!  
Multi-Unit Discounts! CDs And Cassettes!  
Free Catalog!

**ENERGETIC MUSIC**  
P.O. Box 84583 • Seattle, WA 98124  
**1-800-323-2972**

READER SERVICE 61

## ATTENTION PROVIDERS!

Promote your services to **Radio World's** 22,000+ readers. Reach Radio Station and Recording Studio owners/managers and engineers with your message. For information on affordable advertising call **Simone** at **1-800-336-3045**.

Every **FIFTEEN SECONDS**  
**WE'RE HEARD**  
**AROUND THE WORLD!**  
**ID'S, SWEEPERS & PROMOS**  
*J.R. Nelson* **PRODUCTIONS**  
**PHONE / FAX for DEMO & RATES**  
**(803) 268-6521**

Circle (38) On Reader Service Card





# The Dynamax MX Series

## With Enhanced New Feature Set

### Now Available in up to 18 Channels

- True modular design
- Ultra-reliable motherboard construction
- VCA mixer and monitor control
- Active balanced line inputs, transformer isolated mic inputs
- Active balanced main and monitor outputs
- Full monitoring/cueing facilities with VCA level control and active source selection
- Built-in cue amp with speaker and amplified stereo 8-ohm headphone output
- Independent remote start for each "A" and "B" input
- Opto-isolated remote module on/off
- Selectable fader start
- Two inputs per module, mic/line or line/line – line inputs may be mono or stereo, consumer or professional format
- Four assignable outputs – two stereo plus two mono
- Available in 10, 12, 14, 16, or 18 channel models
- Independent level controls for each "A" and "B" input
- Separate audio and logic power supplies
- Sturdy, all-steel construction
- Durable Lexan overlay control surfaces
- Count-up event timer standard
- Two input expansion switches standard
- Excellent RF immunity

8:00 a.m. to 8:00 p.m. EST • 1-800-622-0022 • Fax 317-966-0623  
 Canada 1-800-268-6817 • Toronto 416-731-3687

 **HARRIS  
 ALLIED**



# There's a Right Way



**"I did it right from the start with Computer Concepts' DCS."**

*I don't sweat* when it comes to our spot-heavy morning drive or complicated LMA formats. The reason is simple: First I did my homework. And then I bought a DCS hard disk system from Computer Concepts. In fact, I bought several.

I smile at the thought of multiple program formats and satellite automation, live and live assist. I laugh at complex spot rotations, two-channel crossfades with simultaneous recording and networking to traffic—they're no problem for the DCS.

And Computer Concepts customer support is terrific. Their software experts can even troubleshoot my DCS and upgrade the software remotely, via modem.

No wonder Computer Concepts DCS has turned hundreds of stations into happy customers. I'm glad I'm one of them. Oh, I almost forgot. The price was right, too.



**"I should have bought a DCS in the first place."**

*I thought* I'd impress HQ by buying the cheapest hard disk system I could find. After all, they all look the same! Their promises sounded good and I wanted to believe.

I found out promises come cheap. But their system wasn't really cheap—not once you added up the little "extras" it took to do the bare minimum. And it still couldn't do all the things our station really needed.

I found out the hard way, at 3 AM when the system we bought crashed. And in morning drive, when missing spots meant dollars down the drain. When I finally reached customer support, they said they were working on software they thought would fix my problem, but they weren't sure when it would be done. Guess what I told them?

Now I know better. We're getting a Computer Concepts DCS. I learned a costly lesson: Get it right the first time. Call Computer Concepts first.

# and a Wrong Way

DCS by **Computer Concepts**  
CORPORATION

Computer Concepts Corporation  
8375 Melrose Drive, Lenexa, KS 66214  
Phone: (913) 541-0900 Fax: (913) 541-0169

Circle (26) On Reader Service Card  
World Radio History



## PROMO POWER

# On-Air Talent Needs Good Public Presence

by Mark Lapidus

**FAIRFAX, Va.** The telethon was to begin in 15 minutes. He sat there nervously shifting back and forth in the seat next to mine, frequently looking at his watch. "Any idea when they're giving us scripts?" he asked me. I was surprised by the question. When I replied that I'd never heard of getting a script for a fundraiser like this, his panic increased.

The promotion director at this guy's radio station had told him that he'd be given "lines" for his part of the telethon. Two common mistakes had occurred. The talent had not been given the correct information about the event. Even worse, the wrong person had been picked for the job.

This particular personality was not comfortable ad-libbing! Before you go through that next stack of tapes and resumes, let's explore hiring, assigning and communicating correctly with talent.

Many program directors hire talent based strictly on his or her ability to perform on-air. While this may be the most important criteria, it is not the only performance factor to examine.

Radio is show business, and on-air personalities who are unable or unwilling to perform in public deserve secondary roles. Stations with talent larger than life on- and off-air have an edge over their direct competitors with the public and with advertisers. Listeners will remember meeting one of your DJs if they are personable and entertaining. The same is true of your clients.

Air talent is simple to determine by listening to tapes. Examining public performance potential takes a bit more detective work. Begin by asking your job candidate if he or she enjoys making appearances. If he says no during an interview when he is pumped for a new job, it is only going to get worse after you have hired him.

For the person who answers yes, ask for a few of his or her favorite appearance stories. Call several of the client locations he mentions and get an opinion of his performance. If possible, call his former program director and sales manager. Finally, ask for any video he may have of himself on television or appearing in public.

After you are satisfied, make it clear that you will be doing regular aircheck sessions as well as critiquing his or her appearances. This sends the message that you consider this an important matter and that performance can always be improved.

It doesn't take too long to learn who is the best with what type of crowd. Some are better hosting rowdy bars while others can work a shopping center like Monty Hall. Juggling air shift schedules with appearances requires careful planning.

At first, this may cause some friction with the sales staff; inevitably, they'll have favorite DJs that they prefer using. This is why it's important to interact with the account executive involved whenever you are dealing with a sales-oriented event. Make sure the AE is comfortable with your talent selection.

Make your morning show people the stars of the event by letting them introduce your other jocks. Whenever possible at big functions, keep things very short. It is more exciting that way.

Do you really need one of your major personalities for a small event? Consider using part-timers. By charging a smaller talent

fee, this could be appealing to your sales staff. It will take a smaller bite out of what they have to build into a package. If nobody on your current part-time airstaff is capable, look around for actors in local theater. You would be surprised how many of these people can be quickly trained for overnight airwork and smaller appearances.

It is amazing that many people in the communications business have difficulty talking to each other. Clearly explain to talent what they are expected to do at an appearance. Most information can be delivered in less than five minutes on the phone or in person. Provide directions and give them the name and phone num-

ber of at least one contact at the event. Carefully explain to them what they need to prepare.

Perhaps they should write trivia questions for a contest or have knowledge of how to play a particular game that the client has on hand. Although it's a sensitive subject for some people, you should discuss what they are going to wear: shorts and a station T-shirt to the grand opening of a men's store is probably not a good idea.

Detail what equipment he or she will be taking along and what is supposed to come back (he may have to set up his own PA system and banners). Discuss the time he is expected to arrive and

what traffic problems he may hit in that section of town.

For sales events, make sure the DJ knows it is his responsibility to contact the account executive and discuss the plan. Let him know that you would like a report the day after any event. This will help you analyze the successes and the failures.

After a while, talent will begin to ask the questions: "Do you think I should wear this?"... "What do I have to give away?"... "Should I do trivia or a registration drawing?" Of course, there is one question they will never forget to ask: "How much am I getting paid?"

□ □ □

*Mark Lapidus has worked in radio for over 20 years as a DJ, program director and promotions director in Ohio, West Virginia, North Carolina, Texas and, most recently, Washington, D.C.*

## the unity 2000i



the world's **best sounding fm processor**



CUTTINGEDGE

2101 SUPERIOR AVENUE, CLEVELAND, OHIO 44114 • TEL: (216) 241-3343 • FAX: (216) 241-4103

Circle (115) On Reader Service Card

World Radio History



# Ways to Brainstorm Great Sales Ideas

by Bob Harris

**DALLAS** There's nothing like a great idea to help make a great sale. But where do we look for the great ideas? There are ideas everywhere that can help you create and sell more business this year.

A good idea can be the basis for a promotion concept that you can sell. A new idea can help you create a speculative commercial (please do not use the word *spot*) for a prospect that you haven't been able to close. A great idea

may help you sell the biggest annual contract you've ever sold.

Where do we start to find good ideas? Why not turn one sales meeting into a sales brainstorming session? Plan ahead enough to let everyone know to come to the meeting with a few ideas about new business. Be sure to have a giant-size presentation pad of paper to record *all* the ideas.

### Brainstorming 101

The most basic rule of brainstorming is that there are no bad

ideas. Every idea is good and needs to be written down. Afterward, you can go back and sift through the ideas to develop the campaigns and promotional programs that you will sell.

A good brainstorming session needs someone to write the ideas down legibly so they can be referred to during the session as well as afterward. A facilitator who will lead the group to get the creative juices flowing is also a must. This person may or may not be the sales manager, but

should be somewhat creative.

The manager or facilitator should set the parameters of the session. Example sentences include: "We're trying to find some great ideas for first quarter business"; "We need some ideas to sell to car dealers"; "The program director wants to do a special promotion; how can we sell it?"

Then unleash your mind and let the ideas flow. Just yell out your thoughts, but be sure to get them all down on paper. No negative thoughts or comments are

allowed. When things bog down, the facilitator needs to get things going with some new ideas or new directions.

You'll be pleasantly surprised at how many saleable ideas will come from just one brainstorming session. You should plan to hold an idea session once a month or so to help solve sales problems and to create new ideas and products to sell.

### Look around

Another source for new sales ideas should come from the advertising and promotion activity you see around you. The big regional and national advertisers spend millions of dollars creating sales promotions and concepts to sell their goods and services.

There's nothing wrong with recycling a great idea from another market; your program director does it all the time. Pay attention to the national sweepstakes, promotions and gift-with-purchase programs that are being run. Many of these ideas can be adapted to your market and to your specific advertisers or prospects.

Here are a few creative ideas that I've seen recently that can work for you.

The top salesperson at KPLX(FM) in Dallas, recently received a \$15,000 buy from Blockbuster Video by offering a tailgate party at a Dallas Cowboys game. Blockbuster used the party as an internal incentive to reward its top salespeople and managers.

WCJB-TV Channel 20 in Gainesville, Fla., produced a 1993-94 Sports Calendar and sold it to Subway, which filled it with coupons good for each month of the year. What a great sales and bounce back idea!

Speaking of Blockbuster Video, the company teamed up with Fox Photo, a film processing chain, to offer \$6 worth of free video rentals when you got one roll of film developed at Fox. The offer was promoted by both chains and created a nice value-added program.

This type of value-added cross promotion works very effectively in the grocery industry. During the past year our sales promotion agency has placed hundreds of thousands of dollars on Dallas radio stations that have delivered promotional partnerships to the food manufacturers we represent.

KHKS(FM) delivered a tie-in with Blockbuster Video and Dr Pepper for Birds Eye; KVIL-AM-FM gave us a tie-in with the Ringling Bros. Circus and the LPGA Skins Game for Kraft General Foods Light n' Lively; KPLX has produced "buy one get one free" ticket offers to the Mesquite Rodeo for Breyer's Ice Cream; KLUV(FM) brought a \$10 off a kid's ticket to Medieval Times for Light n' Lively.

### Partnership setup

The idea here is very simple. One advertiser contributes something of value to the partnership. continued on page 26 ▶

- All the benefits of a complete audio management and delivery system.
- All the proven value and dependability of an ITC product.
- All the advantages of digital technology.

**T**hat's DigiCenter...Another significant advancement in broadcasting that will expand your capabilities in programming, management, and delivery of pure digital audio sound.

DigiCenter is brought to radio by ITC—the company serving you so well for 25 years. And, we'll be around for another 25, continuing our reputation for bench-

mark products, and for customer service.

See DigiCenter in action. We'll give you a hands-on demonstration of how DigiCenter will expand your horizons both operationally and economically. Find out how DigiCenter improves audio quality, personnel performance and station profitability. Call us and begin your future today.



1-800-447-0414

**BROADCASTING AUDIO**  
For the NEXT 25 years

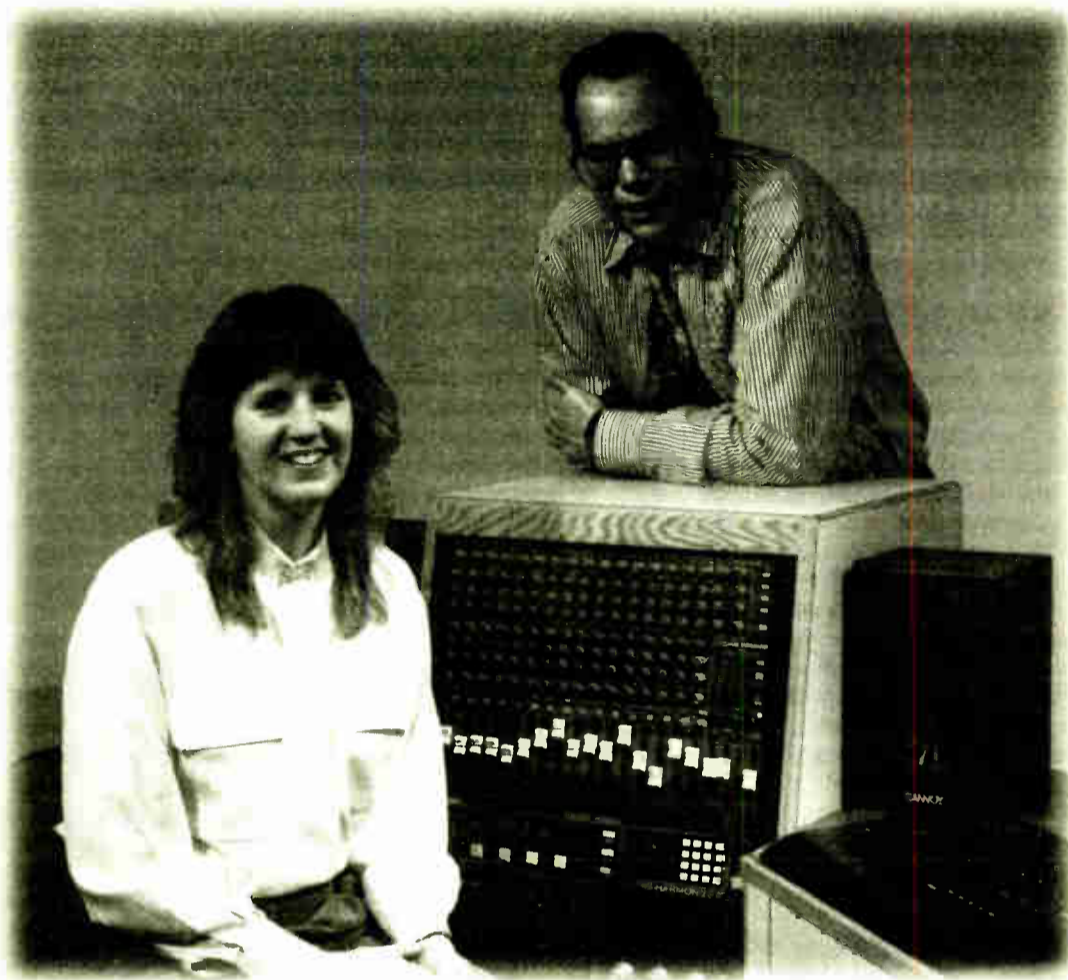
**THE BENCHMARK IN**  
For the past 25 years...



ITC Corporation • 2425 South Main Street • Bloomington, IL 61702 U.S.A. • (309) 828-1381 FAX: (309) 828-1386



# Confused About Digital Audio?



## BSW's Digital Audio Specialists can eliminate your confusion.

"GOING DIGITAL," with all of its benefits, can be a frightening experience, even for seasoned broadcasters. What you need is the help of qualified professionals who have firsthand knowledge and experience with the latest systems and components.

BSW goes the extra mile by appointing two regional Digital Audio Specialists devoted to assisting you with information, configuration, sales and support of the growing array of digital audio systems available to you.

Our specialists are factory trained, and have extensive experience with leading digital audio systems. They are able to offer demonstrations and technical presentations at your regional SBE meetings or trade shows, as well as demonstrations at your facility.

When you need assistance in choosing the right digital products call BSW, the supplier with over 20 years experience in providing leading edge technology to broadcasters.

*Equipment Solutions To Keep You Number One*

**BSW**  
BROADCAST SUPPLY WORLDWIDE

For assistance with digital audio products  
East of the Mississippi, Contact:

**Laura Tyson**  
Voice: 800 · 762 · 5566  
Fax: 908 · 459 · 5540

For assistance with digital audio products  
West of the Mississippi, Contact:

**Rick Kemp**  
Voice: 800 · 426 · 8434  
Fax: 800 · 231 · 7055

7012 27th Street West Tacoma, Washington 98466

Circle (123) On Reader Service Card

World Radio History



MANAGER'S NOTEBOOK

# The Art of Hiring: Good Interviews

by Sue Jones

**BURKE, Va.** Recruiting and selecting staff members can be a key factor in the success of your station. There are several items you will need to prepare to com-

plete an effective interview. Those items include position descriptions to establish qualifications and salary ranges for the position as well as interview rating forms. Just as importantly, you need to prepare a set of interview questions specific to the vacant position. To get the best comparative results, you should ask each candidate the same questions. No matter how experienced you are in recruiting or your knowledge of the vacant position's duties and responsibili-

ties, you should complete this step. Winging it or going with your gut reaction can lead to disappointing results and a mismatched person for the job. A little extra effort and time at this phase of the recruiting process can save you hours of frustration months later if the wrong person is hired.

**What to ask**

**General questions** — Information gathering questions that are not job specific should include questions about salary history. Ask about the last raise and salary progression. Answers that signal potential problems include no increases, extremely large or extremely small increases, or salaries that do not reflect levels of

responsibility. You should ask the reasons for leaving each employer. Look for time gaps between employers.

project reveals more about true strengths and abilities. Open-ended performance related questions encourage the applicant to explain, expand, describe, and/or elaborate on a specific point or topic. Figure 1 compares typical interviewing questions with open-ended performance questions. Suppose you have the most unbeliev-

Figure 1.

Typical Interview Question	Open Ended Performance Question
Would you consider yourself a people person?	Tell me about a time when you had to deal with a dogmatic, arrogant customer/listener.
Have you done a lot of trouble-shooting?	Give me an example of a time when you were effective in doing away with constant surprises and emergencies at work.
Is there any working condition/environment that you find intolerable?	Tell me about a working condition/environment that you found intolerable. How did you get it changed and what happened?
Do you have experience in problem identification and resolution?	Can you describe a time when you identified and resolved a problem? What did you do?
How would you categorize your leadership style?	Give me an example of a time when you used facts and reason to persuade another person to take action.
How would you describe your communication skills?	Describe a miscommunication you had with another employee, client or subordinate and how you solved the problem.

Figure 2.

Typical Interview Question	Open Ended Performance Question
Is there any type of problem you cannot resolve?	Can you describe a time that you were unable to successfully resolve a problem? What did you do?
Are there any personality types or work environment issues that are a problem for you?	Describe an obstacle in your last position that you were unable to resolve.
Is there a task that you do not like to do?	Think of an uninteresting task you had and tell me how you dealt with it.
Have you ever had a problem in dealing with a dissatisfied employee, client or owner?	Tell me of a time when you were not successful in dealing with a dissatisfied employee, client or owner. Looking back, what would you do differently?

If there is a time gap, ask the applicant why he or she left without another position. It is also helpful to inquire about the candidate's goals and ambitions.

**Job specific questions** — Prepare a list of questions that are related to the essential functions and responsibilities of the vacant position. Essential functions should be in the position requirements outlined in position descriptions or vacancy announcements.

Ask open-ended questions that require more than a yes/no or short answer. Your objective is to get the candidate to describe previous job related performance which represent his abilities to handle your position. Some people can fake traits such as aggressiveness, motivation, ambition and team work. Asking a job candidate to describe how he handled a problem or organized a successful

ably qualified candidate, who would be a perfect match for the position. Avoid getting a one sided picture by asking questions that will obtain another perspective. Figure 2 gives some examples.

**Questions You Cannot Ask** — The law protects citizens and non-citizens residing in the U.S. from discrimination based on race, color, religion, sex or national origin. Make sure that your questions will not have a disqualifying effect on minorities or members of the opposite sex.

Your questions should be designed to assess the applicant's competence or qualification for your position. In addition to the above subjects, do not ask questions about gender, marital status, children, health and physical data for the applicant or dependents, transportation, housing, finances, political or social affiliations, citizenship or

continued on page 26 ▶

## Products & Services Showcase

For more information on the products shown below, circle the appropriate Reader Service No.(s) on the enclosed Subscription/Reader Service card or contact the advertiser directly.

### The CircuitWerkes AC-2 Autocoupler



More Features. Better Price.

- Auto-connect and disconnect.
- FCC Pt.68 registered.
- Two-Year limited warranty.
- LED Indicators for audio clipping, incoming rings and line status.
- Answers on user selectable number of rings.
- Momentary or latching dry contacts at pickup.
- Momentary open collector output at pickup.
- Defeatable pickup inhibit function for cart decks, etc..
- Can be combined with CircuitWerkes DTMF decoder board to form a dial-up DTMF remote control.
- Optional ComboLok provides for secured access.

### CircuitWerkes

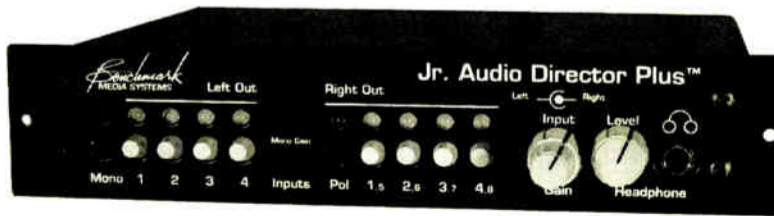
6212 SW 8th Place  
Gainesville, Florida 32607  
(904) 331-5999  
fax (904) 331-6999

READER SERVICE NO. 128

### Introducing (ta-da) The Jr. Audio Director Plus™!

It's an 8 input to 2 output ON LINE or monitoring device.

\$550



The new Benchmark Jr. Audio Director Plus™ brings more to the party! It brings more control and selection features, and a stereo headphone amplifier, along with the performance and value that are traditionally a Benchmark for the industry.

In a half wide, 1RU high chassis, the Jr. Plus has two input switch banks which allow left and right outputs to select between eight sources. Additional switches provide a Mono Mix, with adjustable gain reduction of 3 to 6 dB, and a Right Channel Polarity reversal. LEDs indicate switch action. Inputs may be passively mixed ahead of the input amp by depressing two or more buttons.

Installation is "instant" with a No-Mod™ Rack Mount adapter and plugable Euro-Style barrier strips.

Available now.



BENCHMARK MEDIA SYSTEMS, INC.

Phone 800-262-4675, or 315-437-6300, FAX 315-437-8119

READER SERVICE NO. 64




# Products & Services Showcase

For more information on the products shown below, circle the appropriate Reader Service No. (s) on the enclosed Subscription/Reader Service card or contact the advertiser directly.

## TOWER LIGHTING CONTROLS

For Aviation Obstruction Lights, Beacons, and Strobe Light Systems.



Photoelectric controls that conform to FAA requirements for airway obstruction lighting. A wide variety of special models also available on a custom basis.

### PRECISION

PRECISION MULTIPLE CONTROLS, INC.  
33 Greenwood Avenue, Midland Park, NJ 07432  
Telephone: (201) 444-0600 • Fax: (201) 445-8575

**READER SERVICE NO. 13**

## Cellcast

REMOTE BROADCAST STUDIO

The CELLCAST RBS-400 1.8 offers complete portability and flexibility for remotes. Complete with a 4-channel mixer, frequency extender, cellular transceiver and landline capabilities, 600 ohm line out, and Vu meter. It is powered by 10 Ni-Cad rechargeable batteries, 12v adaptor, and AC power supply. 24 hour product support standard.

Call Bridget Taylor today for our \$195.00 2 week trial at



**Phone: 918-272-8504**  
**FAX: 918-272-8452**


**READER SERVICE NO. 59**

## SOUND YOUR BEST ON THE AIR!

**CART MACHINE SERVICES:**  
**CART MOTORS REBUILT** to quiet flutter-free perfection-shafts resurfaced  
Single \$120.00 Triple \$140.00  
**CART HEADS RELAPPED** guaranteed to perform like new  
Same day turnaround  
Replacement heads and motors available

**REEL TO REEL SERVICES:**  
**HEADS RELAPPED** and precise digital optical  
**ASSEMBLY ALIGNMENTS** performed for maximum response & head life  
**CAPSTAN & REEL MOTORS REBUILT** for MCI, OTARI and more

For peak performance from your recording equipment, call The Audio Magnetic Professionals.



224 Datura Street, Suite 614, West Palm Beach, FL 33401  
Call 1-800-826-0601 for "Same Day Service" in Florida (407) 659-4805  
Authorized Parts Dealers for: MCI • OTARI • TEAC/TASCAM

**READER SERVICE NO. 105**




## ZEPHYRUS

Quality, service, delivery, and reliability have come to SCPC

The Zephyrus 300 family of satellite subcarrier receivers is trusted by thousands of broadcasters. Carrying on the tradition of excellence (at a fair price) is our 700 series analog SCPC line. Entry of all operating frequencies is done on a front-panel keypad. "Old fashioned" meters monitor RF and audio levels.

**ZEPHYRUS ELECTRONICS, Ltd.**  
171 S. 122 E. Ave, Tulsa, OK 74128  
918-437-3333 Fax 918-438-7322

**READER SERVICE NO. 10**



MADE IN U.S.A.

## I HAVE TO DRIVE TO THE TRANSMITTER? ... AGAIN ?!?!

Why drive when you can call? Using Monroe's 6000 Series Remote Controls and your telephone, two-way radio, microwave link or other audio path you can have complete control over a remote site. For over 15 years Monroe Electronics has supplied the broadcast industry with reliable and affordable DTMF remote control systems.

Let us help reduce your driving time, call Monroe Electronics today.

Distributor and Representative inquiries invited.

**ME MONROE ELECTRONICS**  
LYNDONVILLE, NY 14098

800 821 6001  
716 765 2254  
FAX 716 765 9330

**READER SERVICE NO. 36**

## NEW IS BETTER THAN OLD!

PRISTINE'S QUARTERLY SOFTWARE UPDATES KEEP YOUR SYSTEM STATE OF THE ART AND PROTECT YOUR INVESTMENT

PRISTINE CD DIGITAL AUTOMATION SYSTEM including: 2 heavy duty 486/33/DX computers • 8+ hours of Dolby AC-2 stereo hard disk audio • music scheduling system • traffic system interface • digital editing package • 8 Pioneer TM-3 CD Players • CD audio mixer & amp • installation & training • leasing available

**Pristine SYSTEMS** \$18,995

Distributed Nationally by  
**PROFESSIONAL MANAGEMENT SERVICES, INC.**  
803/370-2400 • FAX 803/370-2314  
INTERNATIONAL 310/670-7500 • FAX 310/670-0133

**READER SERVICE NO. 174**

## Radio World

Vol. 18, No. 3 Radio's Best Read Newspaper February 20, 1994

### Attention Advertisers!

Reach 22,000+ readers world wide. Radio World's Product Showcase provides a perfect medium for test marketing your products and services. It's an efficient, effective and affordable advertising option.

Product Showcase ads always get impressive results!

Advertise in the Product Showcase Directory!

"It Works! It's Great!"

For more information, including rates and deadlines, fax your sales rep at **1-703-998-2966** or call **1-800-336-3045**

Advertising is good for business!

## WE REPRESENT THE FINEST MANUFACTURERS OF BROADCAST AND RECORDING STUDIO EQUIPMENT

### AUDIO BROADCAST GROUP INC.

A new beginning for an Industry standard!  
Now with 3 sales offices to more efficiently provide all your broadcast equipment needs.

For additional information on how we can serve you, please call today

For over 32 years

**MAIN SALES OFFICE** 2342 S. Division Avenue Grand Rapids, Michigan 49507  
Phone: 800-999-9281 Fax: 616-452-1652

**SOUTHEASTERN SALES OFFICE** 200 Fareway Drive, Suite 2 Smithfield, North Carolina 27577  
Phone: 800-369-7623 Fax: 919-934-8120

**WESTERN SALES OFFICE** P.O. Box 1638 Palmdale, California 93550  
Phone: 800-858-9008 Fax: 800-273-3321



**AUDIO BROADCAST GROUP**

**READER SERVICE NO. 151**



# Hiring as an Art: Good Interviews

► continued from page 24

disabilities. If the candidate identifies a handicap requiring special needs, you may ask what he or she believes would satisfy those special requirements.

Questions relating to any of these topics can get your station a discrimination lawsuit.

Now you should have a set of questions outlined that match the position requirements and will get the applicant to provide insightful information. Before the interview, review the candidate's resume, tapes and/or telephone interview notes.

## The interview

All candidates should complete your station's employment application even if they bring a prepared resume. If you do not have an application form to use, I would highly recommend obtaining one. It is an excellent way of gathering the same information for all candidates. No two resume formats are alike and they provide different information about their subject.

Make the candidate feel comfortable. Start the interview with informal conversation such as: "Thank you for taking time out of your busy schedule to talk with me today." Avoid complementing him on his appearance.

When you ask an open-ended performance question, allow the candidate some time to think of an appropriate response. You will get a more complete answer if you are patient. Silence is deadly in the

broadcasting industry, but it can be a useful interviewing tool.

Keep focused on the position and the applicant's skills, abilities and experience as they relate to your position's require-

### For Additional Information

Several companies offer training interview tapes. Some of them are:

1. American Media Incorporated, West Des Moines, IA 800-262-2557.
2. Society for Human Resource Management (SHRM) 800-444-5006.
3. Pfeiffer & Company, San Diego, CA 619-578-5900.
4. Excellence In Training Corporation, Des Moines, IA 800-747-6569.
5. American Management Association, Watertown, MA 800-225-3215.

ments. Take notes during the interview.

If you are favorably impressed, ask the candidate for references, writing, or work samples. For a sales position, this could be a sample proposal. For an engineering position this could be a procedural memo which explains a technical problem in layman's terms such as how to switch to the backup transmitter.

Give the candidate an opportunity to ask

you questions about the position or station. Answer them as completely as possible without revealing sensitive information. Give him prepared information about your station. Ask the applicant to review the essential functions and ask: "Can you perform the essential functions for the position?"

Thank the candidate for his time. Do not indicate that he has the job. You still have some homework to do that involves

checking references, interviewing other candidates or having other staff members interview the candidate. The successful candidate should be interviewed by more than one person at your station. Each person who completes an interview with the candidate should complete the Interview Rating form right after the interview.

□□□

*Sue Jones is a senior manager for Computer Data Systems, Inc., in Rockville, MD. She can be reached at 703-323-0491. Tracey Thomas and Bill Siersema, human resource professionals at CDSI, contributed to this article.*

# Consistent Brainstorming Garner's Steady Stream of Sales Ideas

► continued from page 22

but not necessarily ad dollars, while the other partner spends its money on your station to promote the offer. In all the food examples above, the food manufacturer provided the radio schedule and the station provided the promotional partner and got 100 percent of the buy.

But this type of cross promotion or tie-in partnership can work for any type of business. Do you have a car dealer who will spend money if you have a good idea? Why not run a consumer sweepstakes to the Indy 500? Or why not find some partner who will give a gift to everyone who takes a test drive?

Obviously the partner providing the gift receives the value of the radio advertising, and hopefully in-store signage, in return for the gift offer. You are making both your clients happy in this case. You are getting one some free advertising, and the other a free gift offer that he doesn't have to pay for.

One brainstorming session just on tie-in partners will yield a lot of great ideas and

lead to a lot of new business. Don't procrastinate—schedule that sale-building brainstorming session now!

□□□

*Bob Harris is a sales and marketing consultant to the food manufacturer, food broker and radio industries, and is based in Dallas, Texas.*

*He can be reached at PSM, 900 East Park Blvd., Suite 130, Plano, TX 75074; telephone: 214-424-9660, or fax: 214-578-7084.*

### What's Your BIGGEST Sales Problem?

This column is designed to help you solve your sales problems. To make sure we're on target, we'd like your input. Please let Bob Harris know what you would like to see in this column, sales problems you are having, or information that would be most helpful to your sales efforts.

# MARTI

Don't wait 8 weeks to get your new STL system. We've been selling FCC approved STL systems since 1970, and we've got them in stock, ready to ship.



## STL-15C Composite Transmitter

Frequency synthesized \* Unexcelled narrow band performance \* Digital ready (with external modems)

For more information call:

**MARTI Electronics, Inc.**

PO Box 661

Cleburne TX 76033-0661

Phone: (817) 645-9163 • FAX: (817) 641-3869

Circle (132) On Reader Service Card

**You can measure...**  
with the best monitor and the most accurate test set.

The FMM-2/FMS-2 series monitors provide an even greater degree of precision measurement than ever before... **You can measure** S/N below 90 dB, **You can measure** crosstalk below 85 dB, **You can measure** separations of better than 70 dB, **You can measure** frequency response to better than 0.25 dB, **You can measure** distortions to lower than 0.01%, and much more... Our uncluttered panels and autoranging voltmeters make these measurements a dream.

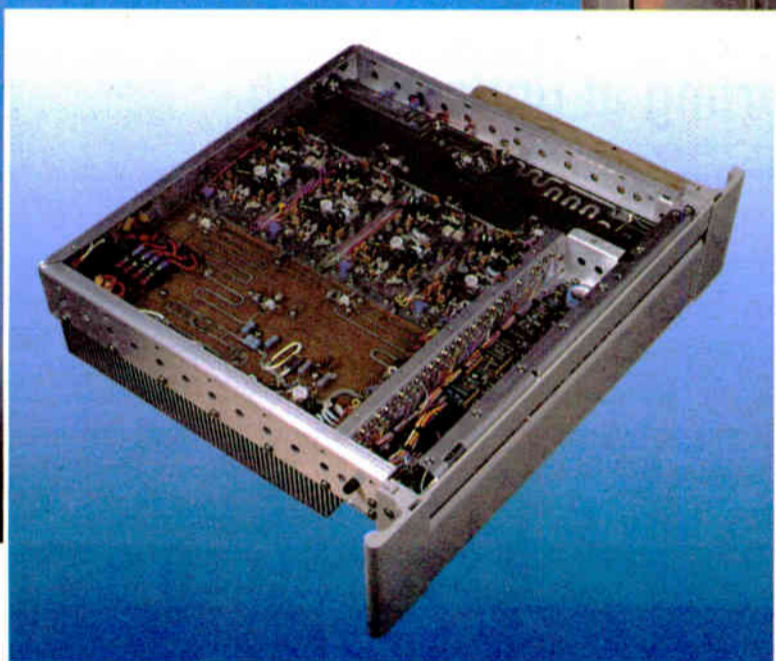
**BELAR**  
ELECTRONICS LABORATORY, INC.  
LANCASTER AVENUE AT DORSET, DEVON, PENNSYLVANIA 19333  
Call or write for more information on Belar AM, FM, Stereo, SCA and TV monitors.

(610) 687-5550

Circle (79) On Reader Service Card



HARRIS PLATINUM SERIES®



## 200,000 Hours' Fault-Free Performance. And Counting.

That's the level of reliability more than 70 users of Harris Platinum Series® 2-20 kW FM transmitters are experiencing from our FET solid state modules.

Broadcasters from Cyprus to Australia. New York to Madrid. China to Malta. Argentina to Slovenia. Toronto to Taiwan. North Dakota to Arkansas.

Beyond continuous transmitter availability, Platinum users are enjoying such benefits as:

- On-air service capability, up to 90% less routine maintenance and no requirements for tuning or adjustment;
- Superb signal quality under any combination of operating extremes;
- Immense flexibility in system design with such options as the world's first truly digital FM exciter with CD performance, N+1 capability, and switchless combining for high power transmitters.

To learn how a Platinum Series FM transmitter can work for you, please contact us:

**U.S. and Canada:**  
Telephone: 217-222-8200  
FAX: 217-224-1439

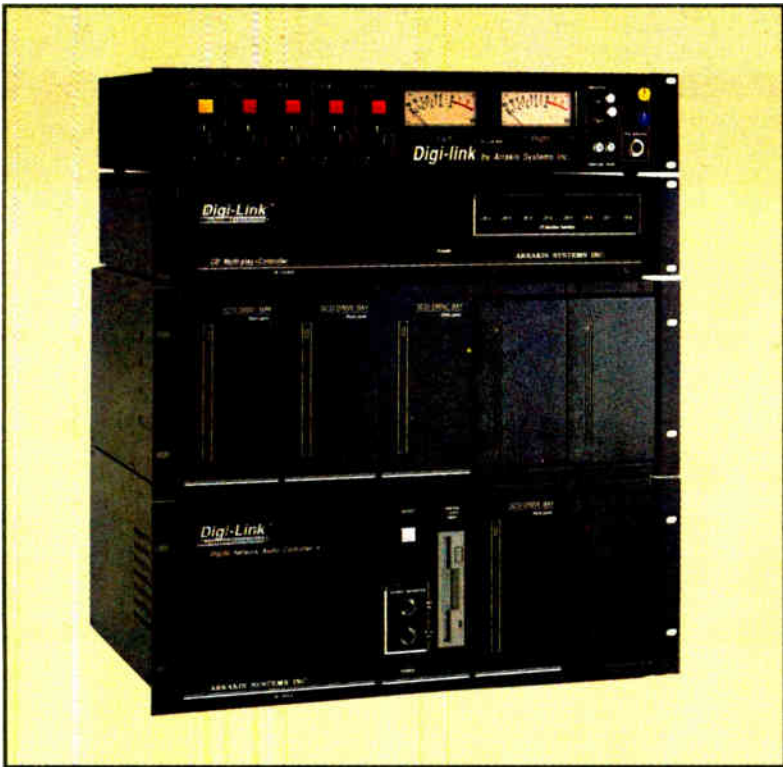
**International:**  
Telephone: 217-222-8290  
FAX: 217-224-2764

 **HARRIS  
ALLIED**



from Moscow to NY & from Paris to Tokyo...

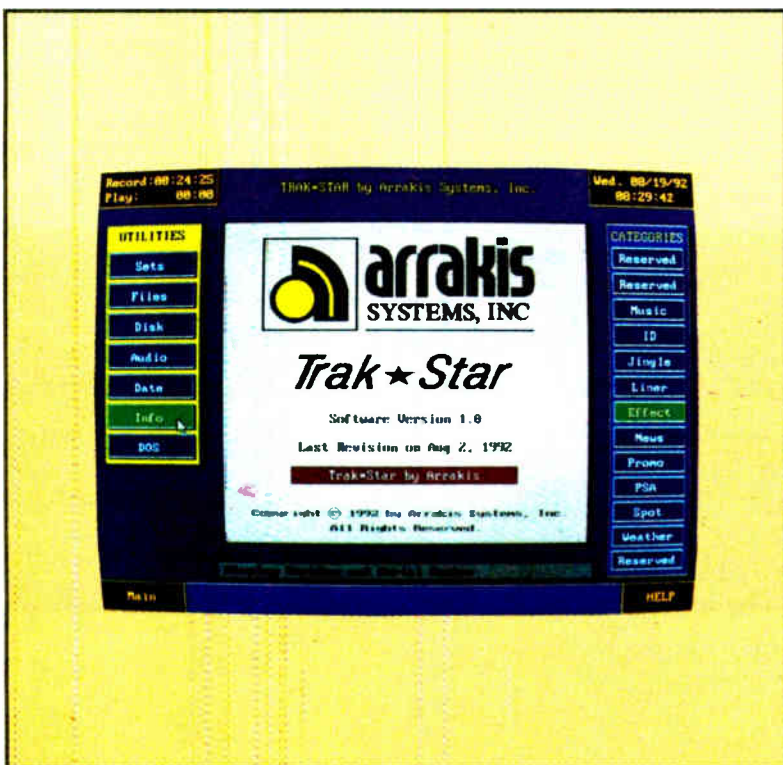
# MORE STATIONS BUY ARRAKIS!!!



## **DIGILINK...** **THE #1 DIGITAL SYSTEM** **starting at under \$8,000**

- 10 hours of stereo digital audio storage for \$7,995 complete
- Satellite, CD, Tape and Hard Disk Automation
- Simultaneous Play, Record, & Network transfer
- Digital Editor with Waveform Editing for tight production
- Crossfade CD's, sources, and hard disk audio
- Music Scheduling system built in for basic CD automation
- Digital Networking for transfer of audio and schedules

Digilink is the #1 selling digital audio hard disk system in radio today. You can replace your cart machines for live On Air and have an automation system for walk away at the same time! Link over 15 workstations & scheduling computers on our digital network and transfer audio and schedules between your studios.



## **TRAK\*STAR-8** **THE 8 TRACK DIGITAL EDITOR** **starting at under \$5,500**

- A digital audio editor designed for Radio production
- Learn to use in minutes, much faster than tape
- Cut, splice, move, and fade up to 4 stereo tracks
- Use Scrubbing to edit with your ears
- Use visual waveform editing to edit with your eyes
- An UNDO button enables you to go back and fix mistakes
- Digital Networking to transfer audio to your On Air machine
- Add Trak\*Star-8 software to a Digilink for \$2,000

Trak\*Star-8 is the first cost effective multitrack digital audio editor designed for the radio broadcast professional. Fast and easy to use, produce your commercials on Trak\*Star and then transfer them in digital straight to the Digilink in your On Air studio. Dramatically reduce production time and save money!!!

2619 Midpoint Drive, Fort Collins, CO. 80525

Voice (303) 224-2248



## 12,000 Series Consoles



Standard Tabletop Mainframe displayed above

- Totally Modular Console-Input-output-monitor
- Three Mainframe Sizes - 8, 18, 28 input channels
- High Quality Construction-P&G Faders, etc.
- Polycarbonate overlay-for scratch resistance
- VCA Controlled Faders-for ultra reliability
- Universal Mainframe-any module in any position
- Inputs-2 per channel
- Outputs-3 stereo, Pgm, Aud, Utl
- CR Monitoring-stereo Monitor, Earphone, & Cue
- Studio Monitoring-two studios supported
- Talkback-two studios w/monitor dim
- Telephone interface-2 internal mix minus buses
- Timer-60 minute digital up timer standard
- Options-DA module, Remote selector module, Dual Machine Control Module

Deluxe thru-table mainframe displayed below

### Typical List Price

\$4,000 - \$7,000

From France...to Moscow...to Japan and Taiwan, and around the world...the 12,000 console is On the Air.

The 12,000 is the #1 selling Arrakis console line from the #1 console manufacturer. With three stereo output buses and two mix-minus buses for telephone interface, the 12,000 can fill any application. The 12,000 also supports a control room and two studios standard. Panning or Mode select are available on the four models of input modules, VCA control of audio delivers reliability and performance.

Quality, performance, and durability make Arrakis consoles the leader around the world.



14 1/4" x 20 3/4"

**Arrakis Systems is a world leader in radio studio technology. In Japan, Digilink is a brand name for hard disk audio for radio. For use around the world, the United States Air Force chose the 10,000 series console from among all competitors as its console of choice. When the United Nations needed 6 entire studios with consoles and furniture for a rush shipment to Cambodia early this year, they chose Arrakis 10,000 consoles and Modulux furniture. In Jamaica, Tahiti, and elsewhere, entire factory assembled and tested Arrakis studios are on the air. Around the world and of course in the United States...more stations buy Arrakis for their digital audio, console, and furniture needs!!!!**

FAX (303) 493-1076

by **ARRAKIS SYSTEMS inc.**





## Meat And Potatoes à la Fidelipac

### Cartridge Machines

The DYNAMAX CTR10 Series needs no introduction. Over 10,000 units are installed in all four corners of the globe. Over the years, the unit has been refined and now includes a brushless DC servomotor. The CTR10 Series combines good value, reliability and high quality audio.

### Tape and Tape Cartridges

DYNAMAX COBALT Cartridges provide excellent high frequency response, high sensitivity and increased head room, and are ideal for top quality reproduction from a digital audio source.

The AUDIOMAX 4000 offers premium quality as well as phase and bias compatibility with more expensive Type AA-4 cartridges and is suggested for stereo applications requiring elevated recording levels.

The MASTER CART yields maximum performance at standard operating levels and is well suited for general purpose stereo recording.

The MODEL 300, workhorse of the broadcast industry for thirty years, this cartridge is intended for monophonic use at standard recording levels.

DYN-400X Professional Back Lubricated Recording Tape is a low noise mastering tape for use at standard recording levels and is available on NAB hubs or 7 inch reels.

### Magnetic Erasers

The DYNAMAX ESD10 uses dual full-track erase heads to ensure deep cart erasure of 75 dB or more. The patented splice detector which requires no sensitivity adjustments rapidly locates the splice and positions it perfectly before recording.

The BLANK-IT hand held eraser is molded of rugged plastic for light weight, easy to handle, quick and accurate tape erasing in any setting.

The MODEL 400 table-top eraser features a hardwood case, scuff resistant laminate top and removable aluminum pivot pin permitting erasure of audio, video or computer tape reels up to 11 inches in diameter x 1 inch wide.

### Other Accessories

Fidelipac offers CARTRIDGE STORAGE SYSTEMS in numerous configurations including a 25 slot vertical wall rack, a 200 slot mobile carousel rack mounted on heavy duty casters, and table-top units which hold 96 cartridges or up to 48 cartridges (as shown above).

Fidelipac's world standard WARNING LIGHTS are available in eight different languages plus custom versions on request. Back illuminated brilliant red letters on an opaque black foreground command attention and visibility.

In addition, other useful accessories (not shown) include alignment cartridges and precision gauges for head insertion and right angle zenith calibration.

**For a complete menu or information about our digital audio products, call Fidelipac.**



**DYNAMAX**<sup>®</sup>  
BROADCAST PRODUCTS BY FIDELIPAC<sup>®</sup>

Fidelipac Corporation □ P.O. Box 808 □ Moorestown, NJ 08057 U.S.A. □ TEL 609-235-3900 □ FAX 609-235-7779

Circle (204) On Reader Service Card  
World Radio History



# LAN Plan Beats Walking with Floppies

by Richard Mertz

**WASHINGTON** In my last column (RW, Jan. 12), I set up a scenario for a radio station installing a local area network (LAN) to share all of its computer resources.

The station has installed a 486 DX, 33 MHz, with 8 meg of ram, a super VGA board, 450 meg hard disk storage, a 1,024-by-748 VGA multisync monitor and a laser printer in the sales office.

An old XT clone has been moved into the engineering department and an AT clone is in the program director's office. The program director and engineer both have dot matrix printers attached to their respective computers.

The LAN is being installed to replace the station's current "sneakernet" system: the engineer and PD putting on sneakers and running to the sales office with a disk whenever they need to use a powerful computer and laser printer.

### Serving the peers

Usually a LAN requires a computer dedicated to do all the network house-keeping chores. This machine is called the "server" because it serves up application files and routes printed material to the printers for the workstations (also known as "clients") connected to the network.

For our application, it is not practical to bind the most powerful computer in the building to only one task. A peer-to-peer LAN, which permits each workstation to act as a server, client or a combination of the two, is more appropriate. Each computer on the network can share printers and access to files.

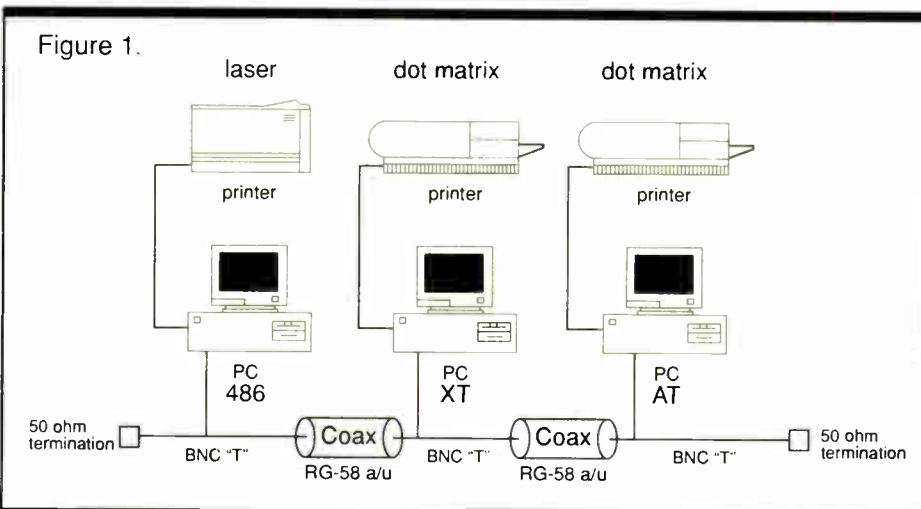
I wish I'd had this setup during my former position as chief engineer at WJZE(FM) Washington. We maintained a database of names and addresses of listeners who either wrote to the station for information or filled out an information card at station functions. People on the

list would receive our periodic newsletter highlighting station events and promotions.

The database file with all these names was over 17 megabytes. When there were problems with the database, I would have to work on the promotion director's computer. This would tie up another department's computer and keep me away from my desk and phone.

Ethernet thin-wire adapter cards are available from many manufacturers. Be sure to get the adapter card that mates with your computer. AT class, 386 and higher computers use 16-bit cards. XTs require a card that can operate in an eight-bit mode.

I once built a peer-to-peer LAN using an Intel EtherExpress 8/16-bit adapter card and two Accton EN1652 16-bit



I was in the middle of a transmitter installation at the time, and missing a call from a vendor, contractor or lawyer would bring my productivity to a crashing halt.

My only alternative was to make a backup of the database file, which was a royal pain in the you-know-where with the 360K floppy drive on the promotions director's computer.

With a LAN I could have copied the files from one computer to the one in my office without leaving my chair.

### Wiring

Each computer in our imaginary LAN requires its own network adapter card. This facilitates the transfer of data packets (bundles of data bits) from the computer to the network cable, with a thin-wire Ethernet system.

adapter cards. All cards had BNC connectors protruding from the back. BNC connects to a standard BNC "T" adapter.

Ethernet was introduced by Xerox in the early 1970s when there was thick-wire Ethernet, as it is known today. This system used a transceiver clamped to RG-8

cable. The computer was connected to the transceiver via a multilead cable.

Thin-wire systems, which use RG-58 a/u cable, are much simpler. The a/u cable specification is especially important for any thin-wire Ethernet LAN application. Many LAN adapter cards will not work with plain old RG-58.

The cable may bear the specification IEEE 802.3, which indicates that it meets the IEEE specification for thin-wire Ethernet. (If you're wondering about the cost, I recently purchased 100 feet of RG-58 a/u for 17 cents per foot.)

Be sure to get proper connectors for this cable. I prefer the easy-to-install, crimp-on type.

Cable layout is crucial. Figure 1 shows a typical thin-wire installation, with the wire connected much like an RF transmission line.

A 50 ohm termination is at each end. Cable is connected to each computer with one end on the BNC "T" adapter. The cable then connects to the other end of the BNC "T" adapters and is connected to the other computers in the LAN until the last machine where the line is terminated.

Running the cable is the hard part, in my experience. Once that is done, software installation of the interface adapter cards can begin, which will be the subject of the next installment.

□ □ □

*Richard Mertz is senior engineer at Jules Cohen & Associates, P.C., 1725 DeSales St., N.W., Suite 600, Washington 20036. He can be reached at 202-659-3707.*

**do you want it to do?**

The HPT Series from BEXT is everything you've heard it is: it can be an exciter, a transmitter, a translator and a booster in one high performance, fully featured package. From \$3,695 to \$3,985.

**BEXT**

1045 10th Ave. • San Diego, CA 92101  
619-239-8462 • FAX: 619-239-8474

Circle (9) On Reader Service Card

# MARTI

**Don't wait 8 weeks to get your new STL system. We've been selling FCC approved STL systems since 1970, and we've got them in stock, ready to ship.**

**STL-15C Composite Transmitter**

Frequency synthesized \* Unexcelled narrow band performance \* Digital ready (with external modems)

For more information call:

**MARTI Electronics, Inc.**  
PO Box 661  
Cleburne TX 76033-0661  
Phone: (817) 645-9163 • FAX: (817) 641-3869

Circle (120) On Reader Service Card



# Products & Services Showcase

For more information on the products shown below, circle the appropriate Reader Service No.(s) on the enclosed Subscription/Reader Service card or contact the advertiser directly.

**NEW!** **Composite Audio DA and Switcher!**



**APPLICATIONS**

- Switching Between Composite STL's
- Main/Alternate Processing Switching
- Feed Up to 3 Transmitters with Identical Audio
- SCA or SAP Generator Switching
- Non-Intrusive Composite Testing/Monitoring

**FEATURES**

- 2 Input Switcher
- 3 Isolated Outputs
- Individual Level Control for Each Output
- Front Panel and Remote Control with Full Status
- Power Fail Memory with Bypass Mode
- Input's Selectable for Balanced or Unbalanced Operation

**bdi Broadcast Devices, Inc.**  
5 Crestview Avenue  
Peekskill, NY 10566  
Tel. (914) 737-5032 FAX: (914) 736-6916

**READER SERVICE NO. 125**

**RECORDABLE CDs**

Allows

- INSTANT CUEING** of station ID's and spots
- CONSERVE SPACE** consolidate selected cuts
- ULTIMATE FIDELITY**

Quick Service

**AS LOW AS \$59.00 PER DISK!**

Your Transfer Headquarters!

Third Story Recording  
5120 Walnut Street  
Philadelphia, PA 19139

**1-800-497-DISK (3475)**

**READER SERVICE NO. 148**

**ECONCO**

**Econco REBUILT POWER TUBES**



Approximately One Half the Cost of New


3,000 Hour Unconditional Guarantee

Call for Our Price List

Econco 1318 Commerce Ave. Woodland, CA 95695  
Phone: 916-662-7553 Fax: 916-666-7760 Telex: 176756  
Toll Free: 800-532-6626 From Canada: 800-848-8841

**READER SERVICE NO. 16**

**Zercom Telephone Hybrid ZH-2**



An interface for connecting a telephone line to a studio console. "Now with upgraded performance." It provides full duplex (simultaneous two way audio) for best results. The hybrid sends audio to a telephone line and receives audio from the line. To make up for a telephone line's inherent 15 DB send to receive level difference, it has a nulling circuit which is used to reduce the local send audio as heard back in its receive output.

Adjustable input and output gain controls are provided to accommodate almost any situation. Audio inputs and outputs are active balanced. The telephone line tip and ring connection is set up for a direct line hold configuration or capacitor isolated to prevent DC flow through the hybrid's telephone line transformer. The choice is user selectable on the rear terminals.


There are two null controls for reducing the audio input to output transfer. The hybrid also has an audio processor to reduce receive gain by 10 DB while audio is being sent to the caller. This reduced trans-hybrid leakage to a point where it is not normally audible to listeners.

**ZERCOM**  
Box 84, Merrifield, MN 56465 • 218-765-3151

**READER SERVICE NO. 217**

**DIGITAL ANTENNA MONITORS**

In-Stock-Available for Immediate Delivery



Price US\$2400.00 2 Towers  
Will operate with any remote control equipment.

Price US\$1780.00 2 Towers  
For AM directionals with studio located at transmitter site.

These monitors are state-of-the-art instruments of unequalled accuracy (.5% or better on ratio and .5° or better on phase) and stability. With typical modulation the true ratio readout of these monitors is a factor of 10 more stable than instruments that measure normalized amplitude, and their phase readouts are rock solid. Phase sign is automatic, no extra operation. In addition to the analog DC outputs for remote control the Model CMR has a multiplexed BCD digital output which can be used to drive the Remote Indicator Model CMR-1. RF inputs have dual protection. Gas discharge tubes across the sample line terminations plus relay protection.

**GORMAN REDLICH MFG. CO.**  
257 W. Union St. Athens, Ohio 45701  
Phone 614-593-3150 • FAX 614-592-3898

**READER SERVICE NO. 62**

**Custom!**

Shively FM Antennas offer standard features often unique in the industry: **Custom-designed stainless steel mounts**, included as standard equipment on Shively commercial antennas, ensure a secure and exact interface between the antenna and its support structure. Unlike others who use pieces of chain and "J-bolts", Shively's custom approach assures you of an installation that goes together right the first time, with a minimum of rigging time, and stays that way! Watch future issues of **Radio World** for other unique Shively features.

**Shively Labs**  
A Division of Howell Laboratories, Inc.  
19 Harrison Road, Bridgton, ME 04009  
207-647-3327 FAX 207-647-8273

**READER SERVICE NO. 131**

**RF&A CD100-X**



**CD100 • X Compact Disc Adapter-Amplifier**

Matches any consumer compact disc player or cassette deck to broadcast console input. Only \$99.00 FOB factory or from any broadcast dealer.

**Russ Friend & Associates**  
342 N. Sunnyside  
Clovis, CA 93611  
Phone 209-298-6838 FAX 209-298-8270

Turntable Parts/Felts  
Russco, Collins TT-200, Sparta

**READER SERVICE NO. 39**

**Digital Dream System**

**\$9,995.00!**



Just \$9,995.00 for this dual digital audio Satellite control with Production system. You get two powerful 486SX-25 computers, VGA color monitors and 535 meg hard disk (9+ hours mono storage), LAN and DMX-4 audio switcher. Includes interface and control hardware. Nothing else is required! This pricing is good for a limited time..

- Great Sound: Premium apt-X™ audio card standard
- Simultaneous record/play for time shift PBR recording
- Separate Production room system with LAN net connect to Control for complete backup & safety.
- Satellite system handles all standard formats
- CD system option from \$1,500 uses Pioneer single or triple 6 packs or 300 disc jukeboxes
- Live assist included, ready for Traffic & Music interfaces
- Many options: External button boxes, more audio & I/O

**The Management**  
1-800-334-7823 1-817-625-9761 FAX: 817-634-9741  
P.O. Box 1-36457 Ft. Worth, TX. 76136  
1600+ Stations - Our 13th year

\* Extra charge for combined Satellite & CD systems. No holds or splits, larger hard drives available at extra cost.

**READER SERVICE NO. 108**

**Efficient & Economical**

Radio World's Products & Services Showcase reaches over 22,000 radio station owners, managers, engineers and consultants every month.

To advertise your product or service, contact your sales representative or Simone Mullins at

**1-800-336-3045**



# ABG Sponsors Mini Trade Gathering

by Dee McVicker

**CHAPEL HILL, N.C.** A regional mini trade show sponsored by the Audio Broadcast Group last fall was considered a success, according to the show's participants.

More than 100 station engineers and general managers got in touch with the latest digital audio products at the October 28 show. The one-day event was held here at the Dean Smith Center's Bowles Room and featured hands-on demonstrations of more than 50 digital products, including digital workstations, editors, telephone hybrids, DATs, and digital cart machines. Three SBE local chapters and radio stations within a 150 mile radius were invited to attend, and six factory representatives were in attendance to answer broadcasters' questions.

"It was a chance for people to sit down with the products," said Cindy Edwards, Southeastern sales representative for Audio Broadcast Group (ABG), one of the industry's oldest broadcast suppliers with offices in Michigan, California, and North Carolina. "Nothing like this had ever been done in this area before."

Broadcasters came from as far away as

Danville, Va., to attend the mini trade show, which was sponsored by ABG in an effort to give local broadcasters first-hand experience with digital equipment.

"There's little opportunity for engineers and owners whose budgets do not permit attending NAB to see what is new out there," Edwards said. "We at Audio Broadcast Group wanted to make that possible. Many national and even regional shows aren't conducive to hands-on demonstrations of equipment," she added.

Doors opened to the event at 9 a.m., and attendees were invited to tour the booths and try out workstations and other digital products. Digital workstations received the most attention by curious broadcasters, according to Edwards.

Fidelipac's Air Marshall, ITC's Digicenter and Broadcast Electronics' AV-100 digital workstations were widely demonstrated to radio engineers, general managers and station production staff. Other products on display at the mini trade show were the Roland DM-80 digital audio work station; consoles from AEQ, Auditronics, Autogram, Fidelipac and Mackie; DAT machines and recorders from Radio Systems, Tascam and Sony; and AEQ digital telephone

hybrids and Audi-Cord's new digital cart machine.

Scott Martin of Fidelipac, Gerardo Vargas of AEQ, Kevin Uttich of ITC, Joe Perry of Roland, Jim Loupas of Audi-Cord, Dave Buck of Broadcast Electronics (BE) were on hand to answer broadcasters' questions and provide live demonstrations of equipment. Later in the evening, BE's Dave Buck gave a presentation on how stations are utilizing digital technology.

Dinner was held in the evening, which coincided with the Thursday evening three local SBE chapters regularly met. The dinner event gave SBE members a chance to meet after they browsed the booths and tried out new equipment. At 9:30 p.m., the show goes finally emptied out of the Bowles Room with literature in hand, and a better understanding of new digital equipment.

Based on the success of the show, it's likely ABG will sponsor another one next year, according to Edwards. "The tremendous success of this show proved to us the need for more of these types of shows. We were happy to provide this opportunity and hope to make it a regular event," she said.

## A DAB Progress Report

► continued from page 14

and FM, and that means USA Digital is the system of choice. If USA Digital's systems perform acceptably, it will be nice to have the additional data as background material but, frankly, broadcasters won't need to know much more.

If there were to be a problem with the USA Digital systems, we'll be right back where we were when the controversies began. If only one of the AM and FM systems performs well and the other doesn't, it will still be sticky. And if several systems perform well but consumer electronics manufacturers favor any other system than IBOC, it will be AM stereo all over again.

This all may read overly negative but if we're considering timetables we have to look at all contingencies.

### World view

While we're busy testing DAB systems, parts of the world will be moving ahead with DAB timetables of their own. This will probably have little effect on what happens here initially, but it could play a role as radio moves increasingly into the world of digital transmission. Canada is forging ahead with the Eureka system on L-band, and while things are moving slowly in Europe, there will no doubt be some progress during the two years of testing and post-test evaluations.

Then there's the big question mark of satellites. It seems pretty likely now that since the FCC has not yet taken action on plans for domestic satellite delivery systems, it will wait for the result on the terrestrial systems as long as test plans are proceeding. That means a terrestrial DAB system could conceivably be in place before direct satellite delivery gets a foot in the door here. But such is not the case in the rest of the world.

Satellite audio services are being planned for other parts of the world and this time some of them are being tied to a

renewed interest in direct broadcast satellite video service. Such services could be operating as early as 1995. What does this mean for our own DAB timetable?

### Beyond tests

Imagine a world where DAB receivers, either satellite or Eureka at L-band, are already in the market. What kinds of pressure might that bring to bear on our own broadcast industry? And these questions loom large when we limit our discussions to just radio/audio. We simply have no way of knowing how a radio service in transition will be influenced by a steadily growing electronic information explosion over the next two years.

Once the tests are completed, the data is evaluated and the reports are in, the question of our DAB future is still not settled. There will be debate, followed by petitions for rulemaking, followed by debate, followed by actual rulemaking, followed by debate, followed by equipment choices, and so on. It seems likely now, that even if in-band on-channel exceeds our expectations and becomes the system of choice, the current analog delivery systems will still be needed, probably indefinitely.

The industry buzz has it highly unlikely

that the FCC will ever seek to impose a "use it or lose it" burden on DAB, and that digital and analog systems, if they can be shown to work well together, will coexist for a long time into the future.

What all of this means is that owners and those contemplating increasing their ownership of stations can breathe a bit more easily than was first envisioned way back in 1990 when DAB took the industry by surprise. We've had a chance to weather an economic downturn and work our way back up the curve to stability and even prosperity.


The FCC's recent actions have allowed the radio market to consolidate and become stronger overall. We're poised to put technical considerations to rest with tests that are remarkably free of argument and stand a good chance of moving us along on our digital future. And we've shown that a spirit of cooperation can invade even the hottest of controversies. No wonder that these days, when the three potent letters "D-A-B," are thrown together in conversations, a sense of relaxation and relief pervades and the fear has all but vanished.

□ □ □

Judith Gross is VP/Head copywriter for MediaScan, a marketing and advertising agency specializing in broadcast and pro audio technology. She can be reached at 212-929-6108.

## Walkaway:

Turn off the lights; lock the doors; go home. A few short years ago this level of automation at radio stations was impossible. But thanks to rapid advances in technology it's now an everyday occurrence. Anyone can go home, but to go home legally it takes specialized equipment. If you're contemplating a walkaway, you need to call about our RFC-1 Dial-Up Remote Control and our DAI-1 Dial-Up Audio Interface. For instant information 24-hours-a-day call our "Fax-On-Demand" from your fax machine and request documents 101 and 110.



**SINE SYSTEMS**  
Voice: (615) 228-3500  
Fax: (615) 227-2367  
Fax-On-Demand: (615) 227-2393

24 Hour FAX ON-DEMAND

Circle (72) On Reader Service Card

World Radio History

## Who's running the ship?

**Unattended operation is one way to keep your station profitable, but you still have to mind the store.**

The acclaimed Burk Technology ARC-16 Remote Control System is the first step. You can control transmitter and studio from any phone.

But wait. There's more!



Introducing AutoPilot™ from Burk Technology.

AutoPilot is break-through computer software that makes automatic operation of your studio/transmitter facility a dream come true.

- Automatic power changes
- Automatic pattern changes
- Automatic site changes
- Automatic power trim
- Automatic fault recovery
- Automatic logging

Now your imagination is the only limit.

The new FCC fine schedule is imposing. Why risk a big penalty when AutoPilot can help you stay within the rules?

Call us toll free at  
**1-800 255-8090**

for more information  
and a FREE DEMO.

# BURK

TECHNOLOGY

Circle (197) On Reader Service Card



# Discussing Changes to AM DA Rules

► continued from page 1

license. The uniform and proper application of moment method and other computer techniques would eliminate this and allow patterns to be tuned much closer to their theoretical specifications.

Ron Rackley of du'Treil, Lundin, & Rackley Inc., and Jerry Westberg, an independent antenna consultant formerly with the Harris Corporation, jointly presented an overview of the application of the method of moments, and the use of NEC (numerical electrical code) and MININEC (a compact version of NEC) as tools in the proper setup of a directional antenna system. The traditional methods assume that current distribution along each tower in an array is sinusoidal.

Rackley explained: use of the moment method reveals that because each tower is simultaneously both a radiator and a receiver (induction from the adjacent towers), the current distribution is no longer a smooth sinewave, but rather a compressed or elongated sinewave. This shifts the relative phase and magnitude of the current or voltage sample that feeds an antenna monitor farther away from the theoretically assigned field values.

The moment method and NEC allows each radiator to be broken up into short sections, with each current moment for each section computed and then summed together for a much more accurate solution. This allows the field engineer tuning up the array to set each tower's parameters

to values predicted by the NEC or MININEC model, according to Rackley.

## Verifying performance

"When we get actual measured tower base or loop operating parameters to closely match those predicted by our MININEC model, we measure an actual pattern which very closely correlates with the theoretically predicted pattern," Rackley said.

Karl Lahm, formerly of Lahm, Suffa, &

**An engineer can spend great effort adjusting the horizontal pattern while actually distorting the vertical pattern.**

Cavell, and now with the VOA, presented the results of various empirical studies which demonstrate that the correct sampling location on each tower must be used for moment method solutions to be accurate and reliable for all heights of towers.

That location turns out to be the detuned antinode, where the current falls to zero when the tower is fully detuned. It occurs between 33 percent and 38 percent of the vertical height of the tower, up from the base, depending on the wavelength.

According to Lahm, "current sampled at the detuned antinode is much more reliable than base current or voltage sampling and is always directly proportional to the radiated field." He pointed out that there is

high correlation with tower heights up to 180 degrees. Beyond that height, Lahm suggested that a correction factor may be needed because the larger height to radius ratios start causing distortion.

Bill Suffa of Suffa and Cavell outlined the various problems encountered by relying only on field measurements to tune a directional pattern. Many sources of error creep into the process, he said, rendering it unreliable. They include: the use of differ-

ing measurement analysis techniques, different ground dielectric constants than those assumed by the standard groundwave graphs, improper map plotting

and incorrect point locations, poor measuring techniques, measuring reradiation off-axis from the array, improper application of near-field proximity correction factors, field meters out of calibration, incorrect non-directional reference power levels, local environmental changes, conductivity shifts due to seasonal changes, and conductivity breaks due to rivers, lakes, and abrupt elevation changes.

## Not new

James Hatfield and Ben Dawson of Hatfield and Dawson, Inc. discussed some case-history success stories using the moment method techniques and pointed out that the defense industry, including Boeing, has been using these tools for over 25 years. Hatfield said various consulting firms have been using them for ten years and have successfully tuned and proofed several hundred arrays, saving perhaps thousands of hours and the attendant expense of field talk-in procedures.

Ron Rackley echoed these sentiments and recounted his most recent experience, spending only six hours on site tuning and proving a new three-tower 10 kW array. An additional six weeks of field measurements and drafting a thick report which totalled \$18,000 was largely unnecessary, according to Rackley.

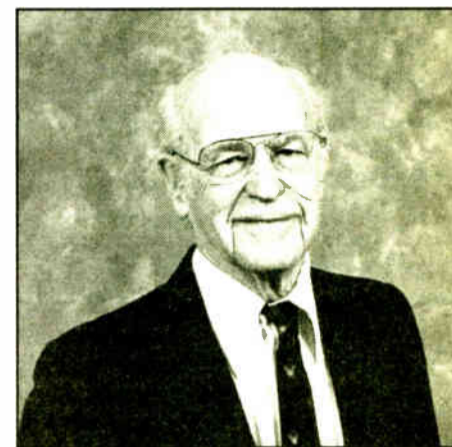
As a starting point for discussion, Rackley offered the following specific rule modification recommendations for stations which want to take advantage of these new techniques:

- Re-establish antenna monitor sampling specifications, including specified sampling locations where calculated values can be known and demonstrated.
- Require certification of tower locations and alignment by a registered surveyor.
- Require certification of the transmission and sampling system installation by the builder.
- Require actual field measurements, both non-directional and DA for only 10 points on only the critical radials of the pattern (minima and minor maxima).
- Establish by ND/DA ratios, the DA inverse distance fields for those radials to within 10 percent of theoretical values.
- Eliminate maps in the 302 filing.
- Eliminate ground conductivity graphs and plots.
- Eliminate monitor points, route maps, and point descriptions.
- Eliminate any requirement for base current measurements.
- Eliminate date and time field log requirements.
- Eliminate the distinction between full and partial proofs.

• Eliminate the double standard of requiring elaborate measurement proofs for AM directional antenna systems when none is required for AM non-directionals or any FM antenna system.

Robert Silliman of Silliman and Silliman, known perhaps as the dean of broadcast consultants, endorsed nearly all of Rackley's recommendations but also stated that single turn, identical unshielded loops should be required for sampling, and that more than ten measurements may be needed for towers using folded unipoles or skirts, as well as for all self-supporting, tapered towers.

In the group discussion which followed the consultants' presentations, Suffa summarized the aim of the overall proposal: "We



Robert Silliman

are proposing to verify directional antenna performance with modern internal measuring methods in a controllable environment as opposed to the old technique of verifying performance with external field measurements in an uncontrollable environment."

## Proven techniques

Jules Cohen, Tom Jones of Carl T. Jones & Assoc., as well as several of the broadcasters attending, stated that while they endorsed the use of the modern methods, they felt uncomfortable doing away with some means of external measuring verification.

Milford Smith of Greater Media cited the need to spot check not only his own operations but also those of the competitors. Smith also felt that more broadcasters should be participating in this forum. Ken Brown of CapCities/ABC pointed out that while the new methods will work for most arrays, there will always be special cases which will continue to need actual field measurements for proper verification.

Ted Schober of RadioTechniques, Inc. added that any new rules should be well crafted to protect against fraud and prevent a "scoff law" situation.

Lahm noted that in addition to antenna monitor sampling, the VOA is also using a power sample monitor at the input of each tower base. Dave Harry of Potomac Instruments echoed the need to employ two separate sample points, perhaps one sampling power or voltage as a cross-check to the antenna monitor sample. Ron Rackley felt that accurate power sampling is not yet available, except at 50 ohms.

An internal calibrating signal could be built into an antenna monitor which would serve to verify proper operation of the tower loop samples, Harry added.

As the meeting ended, most of the attendees agreed that any rule modifications would need to provide for two classes of stations: those that want to take advantage of the new techniques and reduce the burden of exhaustive field measurements and monitor point maintenance, and those that are special case exceptions or who are comfortable with the status-quo.

**RAB 94**  
Managing Sales Conference & Executive Symposium

**ANYONE**  
**who is**  
**ANYONE**

**in Radio Sales & Management**  
**will be at RAB '94!**

**DONT MISS IT!**

**February 17-20, 1994 Dallas, Texas**



**REGISTER NOW - CALL NOW**  
**1-800-RAB-SELL**



# TOMORROW RADIO.

Tomorrow Radio is here. AudioVAULT 100 OnLINE™ harnesses the full power of today's advanced digital networks. Now you can provide recorded audio to every studio and information about that audio to every desk. Now you can achieve total station connectivity, and total station productivity. Start big or small. Start today.

START NOW.

GET OUR  
AudioVAULT 100 OnLINE  
INFORMATION PACKET.

(800) 426-9082

FAX (206) 441-6582

# TODAY.



AudioVAULT 100 OnLINE

**BE** BROADCAST  
ELECTRONICS, INC.

WORLD LEADER IN BROADCAST TECHNOLOGY



## FIELD TEST

# Splatter Monitor Cannot Be Beat

by Margaret Bryant  
Engineering Manager, WMAQ(AM)

**CHICAGO** A few years ago, when the FCC adopted the NRSC standards, AM stations were assumed to be in compliance if they installed an NRSC card or box in the audio chain. But as of June 30, AM stations must make annual measurements to prove compliance.

A spectrum analyzer, a device few stations have or can afford, is the usual device for measuring transmitter emissions. A more affordable alternative is the Delta Splatter Monitor.

At WMAQ, where we have traditionally used a spectrum analyzer to check our transmitter's emissions, we recently had the opportunity to try a Delta Splatter Monitor and compare its operation and measurements with those of the spectrum analyzer.

Both devices have their place, but the splatter monitor was capable of measuring things the spectrum analyzer could not, was more portable and easier to use.

## Operation

To take measurements with the splatter monitor, first plug the RF source into the BNC connector on the rear panel. We

used our usual transmitter sample. There is an RF attenuator switch to adjust the level of the incoming signal.

Then set the "measurement" switch to the "RF cal" position and adjust the "RF cal" knob. (The "RF cal" knob is unfortunately placed next to the audio speaker, and during our test drive we found ourselves occasionally reaching for the RF knob instead of the speaker volume control.) Set the carrier frequency by dialing it up on the thumbwheel switch.

The "measurement" switch is then set in the appropriate position for the desired scale on the meter. In addition to the meter

indications, the signal can be audibly monitored through the front panel speaker. (Try doing that with your spectrum analyzer.) I found it much easier to identify signals I could hear rather than deciphering pips on a scope or peaks on a meter.

However, noise out of a speaker is not the quantitative measurement the FCC requires. Take that measurement by using the "offset bandwidth" switches to direct the monitor to the portion of the spectrum to be examined. Then select the correct scale and the receiver model.

We selected the optional "spectrum analyzer model filter assembly" because we wanted to compare the results with our existing spectrum analyzer photographs. Also, the FCC rules (73.44) have existing specific requirements for spectrum analyzer set up. The commission allows other devices if they are set up similarly to a spectrum analyzer, so we assumed this option was the obvious choice for the measurements.

Other choices for receiver models include "NRSC" and "3 kHz," which is similar to a narrowband radio.

From there, set up the threshold for the peak hold and record the measurements. Our measurements were almost identical to data taken previously on our spectrum analyzer.

## Features

One of the best features of the Splatter Monitor is the synchronous detector section, which will read I (in-phase) signals, Q (quadrature) signals or a combination of the two with the flip of a switch. This is valuable information that can be used to quickly track down any splatter problems and save troubleshooting time.

Splatter in the I signal is frequently due to distortion and clipper products, while Q-signal splatter indicates problems in the transmitter. Obviously, if the station is operating C-QUAM stereo, it will also be seen in the Q signal, but it is easy to differentiate from splatter.

The splatter monitor can be permanently installed at the transmitter site to constantly monitor splatter using the alarm circuitry. The splatter threshold is set and the alarm LED displays peaks that cross the threshold. A contact closure is available on the back of the unit for remote indications.

The alarm switch is also used to set the threshold for the optional peak-hold circuitry. We used the peak-hold setting for all our splatter measurements.

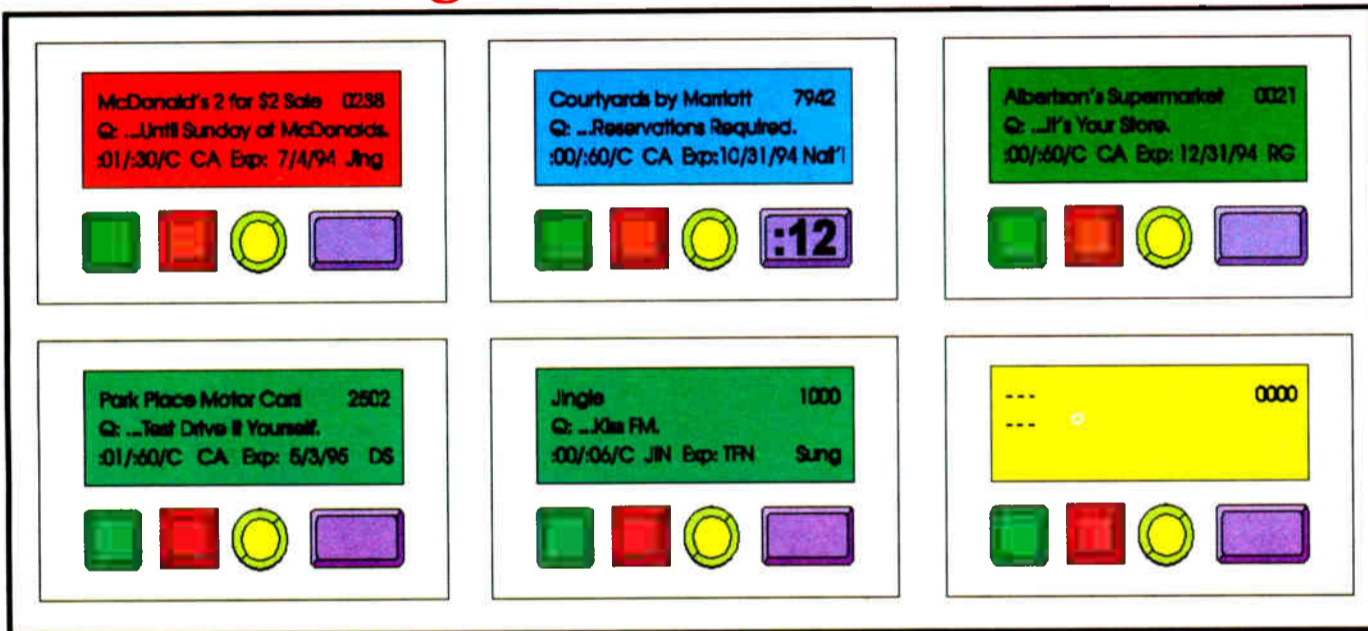
Each of our measurements lasted about five minutes to get a good sample of all types of programming material. Resetting the counter was as easy as switching the peak-hold off and then on again, although a reset push-button might have been faster.

The monitor is also DC-powered to make it portable. The unit is lightweight and comfortably sits on a lap, with the active antenna mounted on the roof with a magnet.

Measurements in the near field give a more comprehensive picture of how the entire transmission system is functioning. We found our field measurements to be a little better than the measurements taken at the transmitter sample. (It was also interesting to read other stations' measurements.)

Overall, we found the monitor easy to use. It comes with a very complete instruction/repair manual. Spectrum analyzers still have their place for certain kinds of measurements, but the Delta Splatter Monitor can't be beat for easy use when measuring compliance with FCC rule 73.44 and troubleshooting splatter problems.

## The First Digital Audio that Jocks Like!



## Awesome High Quality - Amazing Low Cost

Make your move to stunning sound with CompuCarts cart machine replacement. It's an easy-to-use PC system with Scott Studios' software for digital hard disk audio. You see six "cart players" on screen in your air studios and a "cart recorder" in production. Account name, lengths, start and end dates, categories, outcues, initials and countdown timing displays clearly on screen. Or, at a touch you can see your program log, live copy, or pick from any spots, jingles or music.

Touch any of six start buttons (or our optional touch screen) and your commercials, jingles and liners are instantly on-the-air from hard disk. There's no clutter or confusion in your air studio: no computer keyboard, no mouse, no trackball, no stacks of floppy disks and no racks of cart tapes. CompuCart automatically receives each day's log from your traffic PC, and updates can be made by "10-key".

When new production is done, all commercials are instantly playable in every CompuCarts air studio. Nobody has to redub spots or retype labels for additional stations. Your people will also save time because nobody has to walk anything down the hall from production to air studios. CompuCarts cost less than analog gear, and no expensive "file servers" are needed for Multi-Studio Digital. CompuCarts can also control CD juke boxes, automate certain shifts, or run a satellite format. Call, FAX, or write for details.



**Scott Studios** corp  
13375 Stemmons, Suite 200  
Dallas, TX 75234-5774

(214) 620-2211 FAX: (214) 620-2707  
(800) 330-3004



# Satellites Make Sense During Duopoly Era

by W.C. Alexander

## Part I of II

**DALLAS** Our company, Crawford Broadcasting, has really been growing. Recent changes in the FCC ownership rules and in the business climate have created the right conditions for expansion.

With expansion, however, comes the need to link all our stations together to deliver program material, commercials, promos, public affairs and the like.

We aren't operating a network here. All our stations are pretty much autonomous with each doing its own programming to suit the local market. But we do have some common program elements that we have been distributing to the various stations via mail, Federal Express, UPS and other surface and air carriers.

A couple of years ago, we discovered that we could purchase a couple of short (10-minute) daily time slots on a network's subcarrier and feed some material from Dallas to almost all of our stations. This worked out pretty well for a while, but we soon outgrew it and began exploring alternatives.

We found that we could have our own full-time digital satellite channel for a very reasonable price. We now have four uplinks, and seven downlinks using two full-time stereo digital channels.

## Satellite Basics

Many stations and group operations, I suspect, are in the process of putting their signals up on a bird. In the coming years, satellite operations will play a greater role in the day-to-day routine of many radio stations.

Satellites in geosynchronous orbit rotate in sync with the earth's rotation so that, from the earth's surface, they appear to be fixed in one position. Lower satellites rotate faster and higher ones rotate slower.

Most satellites in use by broadcasters are positioned over the equator at an altitude of 22,300 miles. From this lofty perch, these satellites can see almost half the earth's surface, giving them tremendous coverage.

Communications satellites, which are, in effect, unmanned relay stations, operate at microwave frequencies. The ionosphere is always virtually transparent to these frequencies, regardless of sunspot activity or time of day. Domestic commercial communications satellites over the U.S. operate in the Fixed Satellite Service (FSS) bands defined as the C-band (6 GHz and 4 GHz) and the Ku-band (14 GHz and 12 GHz). The C-band has been the band of choice for radio and TV because of superior propagation characteristics.

While orbiting the earth, the gravitational fields of other bodies in space act upon geostationary satellites to pull them out of their assigned orbits. If left alone, they would eventually wander far out of the proper orbit and become useless.

To overcome this, telemetry, tracking and command (TT&C) earth stations continually monitor the position of each bird. Small jets of a propellant, such as hydrazine, are used to maintain each within its prescribed orbital "box." This

box is typically  $\pm 0.1$  degrees or less on each side and oriented with the sides parallel and perpendicular to the orbital plane.

Once the satellite runs out of propellant, its orbit can no longer be maintained and it becomes unusable.

## Leaving footprints

The antennas on satellites are designed to cover only desired regions of the earth's surface. This accomplishes multiple purposes, concentrating the power radiated by the satellite into desired directions, increasing the sensitivity of its receiving antenna and reducing the possibility of interference with signals from other satellites.

The part of the earth's surface covered by a particular satellite is called the satellite's "footprint." U.S. domestic satellites often limit the footprint so that neighboring countries are protected from interference.

Like terrestrial AM, FM and TV signals, satellite signals are polarized either linearly, circularly or elliptically. Linear polarization is either horizontal or vertical, while circular is either left-hand or right-hand circular. Most domestic satellites are linearly polarized, with the antenna and wave tilt angles aligned in space. If proper polarization is not maintained, the signal will be weak and undesired signals will interfere, because cross-polarized signals carrying different information are present on the same frequencies.

There are a limited number of orbital slots and frequencies available, so multiple-access schemes are used to maximize resources. The frequency division multiple access (FDMA) scheme allows signals to share transponder bandwidth in separate frequencies. Time division multiple access (TDMA) allows signals to share the transponder in discrete time slots. A third scheme, code division multiple access (CDMA), allows coded signals to overlap in time and frequency on the transponder.

Performance standards used to evaluate a particular satellite system are the signal-to-noise ratio (SNR) for analog systems and the bit-error rate (BER) for digital systems. SNR and BER are dependent on the pre-detection carrier-to-noise density ratio ( $C/N_0$ ) and the carrier-to-noise ratio ( $C/N$ ) in the receiver; the type of modulation employed, and the RF/baseband bandwidths.

## The bands

In the early days, C-band was favored for communications satellites because of its propagation characteristics. It uses 5925-6425 MHz for uplink and 3700-4200 MHz for downlink. The U.S. domestic FSS requires the use of 36 MHz bandwidth channels on 40 MHz centers.

A single bird using dual polarization can provide 24 C-band transponders. Frequency reuse is achieved by orthogonal polarization and by staggering the carriers of alternate transponders.

Ku-band systems, using 14-14.5 GHz for uplink and 11.7-12.2 GHz for downlink, were first launched in the late 1970s. The higher frequencies used by Ku-band systems reduce propagation,

which must be overcome by higher antenna gains. Ku-band frequencies are not shared with terrestrial applications, so the potential for terrestrial interference is much lower and coordination is not required.

High power transmission allows for the use of very small earth station antennas at or near the user's premises (as opposed to the much larger antennas required by C-band). The primary limitation of Ku-band systems is rain fade. Higher-power satellite signals are pretty well "soaked up" during heavy rainfall.

There is no mandated frequency plan for Ku-band transponders, but typical transponder bandwidths are 36-72 MHz. A 24-transponder, 36 MHz frequency scheme with 40 MHz channel spacing is common on Ku-band.

Next time, I'll look at satellite system performance, earth stations, antennas and equipment, and interference.

□□□

*Cris Alexander is director of engineering for Crawford Broadcasting. He can be reached at Box 561307, Dallas, Texas 75356.*



**QEI** meets all your FM broadcast transmitter needs.

**Selection**

- 10 Watt - 1250 Watt Solid State
- 1 kW - 30 kW Single Tube
- Choice of Single or Three Phase Power Supply on 3.5 kW to 30 kW models

**Service**

- 24-Hour Service Hotline: (609) 728-2020
- **Free** Initial On-Site Checkout for FMQ-Series Transmitters
- **Free** Spare Parts Kit with every FMQ-Series Transmitter
- Extended PA Tube Warranty—the **only one** in the Business

**Reliability**

- Ultra-Low Maintenance
- Single Tube Design Eliminates Driver Tube
- No Sliding Contacts—Avoids Wear-Out
- Positive Pressure Cabinet to Prevent Dust Infiltration

**Experience**

- Over 20 Years of Field-Proven Designs
- RF Products for Broadcast, Scientific and Military Applications
- Total In-House RF Design and Manufacturing

Learn more about the finest FM broadcast transmitters in the business. Call Jeff Detweiler today toll free—**(800) 334-9154**.

**QEI Corporation**  
One Airport Drive • P.O. Box 805  
Williamstown, NJ 08094

Tel: (800) 334-9154  
Fax: (609) 629-1751  
24-Hour Service Hotline  
Tel: (609) 728-2020

Circle (56) On Reader Service Card



March 20 - March 24, 1994  
Las Vegas Convention Center

**NAB '94**

# **INNOVATION EVERYWHERE YOU TURN!**

*Innovation is easy to find at NAB '94. It's all around you.*

*You'll see it at the NAB '94 exhibition, where 800 companies will captivate you with the most innovative broadcast and multimedia equipment, products and services available anywhere.*

*In the separate radio/audio exhibition hall, you'll see the latest developments in radio transmitter technology, studio and audio equipment, consoles, CD players, digital production workstations and digital audio tape machines.*

*And, you'll discover innovation in world-class conference programs such as the Broadcast Engineering Conference, the Radio Management Conference, the Radio Advertising Bureau Sales and Marketing Management Conference, the Broadcasters' Law and Regulation Conference, and NAB MultiMedia World. In all, there will be 250 technical seminars and workshops from which to choose — each designed to give you the knowledge you need to compete and succeed.*

## **REGISTER TODAY!**

*Call 800 342 2460, or 202 775 4972 or send a fax to 202 775 2146.*

*Get up-to-the-minute convention registration and program details by calling the NAB '94 Fax-On-Demand service 301 216 1847 from the touch-tone handset on your fax machine and follow the voice instructions.*

*For exhibitor information, call Eric Udler at 202 429 5336.*

## **JOIN NAB AND SAVE!**

*Save \$300 on NAB '94 registration when you become a member of NAB. For information on member benefits, call 202 429 5400.*





# WORKBENCH

## Low-Cost Switch Upgrades Discrete STLs

by John Bisset

**FALLS CHURCH, Va.** Ken Blake, a station consultant with an office in Stockton, Calif., sent in a simple discrete STL switching schematic that he has built for budget-minded stations that don't have the resources for the fancy auto-switch panels.

mono using the remaining operational components.

This is a good idea in theory, but unless you have a means of switching STL links, a malfunction in either chain can result in a protracted period of unwelcome noise on the broadcast channel, or muting on one channel.

Ken's simplified relay switching network is shown in Figure 1.

The relay coil voltage requirement dictates the operating voltage. R-1 and R-2 make up a voltage divider, which is used to limit the maximum metering voltage fed to the remote control. These values are based on the remote control requirements. K-1 and K-2 are 4PDT relays. Release relays K-3 and K-4 are SPDT.

The receiver outputs in a typical discrete system run to separate audio limiters which then feed the stereo generator. Assume that Channel 8 on the remote control is used to control the left channel, and Channel 9 is used for the right channel.

Suppose a problem arises and, for example, the right channel audio disappears. The operator selects Channel 9 on the remote control and presses "RAISE." This lifts the receiver output from the limiter input, and parallels the left channel into both limiter inputs.

If your limiter input is not bridging, you'll need to build up a resistive splitting pad.

A voltage is provided to indicate that the

relay is on, verifying the switch has been made. The remote control meter indication is calibrated to an arbitrary value, such as 100. If the remote control has status channels, they could be used as well.

Once the problem is corrected, press the "LOWER" button for that channel on the remote control to the release relay contacts and return the channel to its normal state. The metering indication will fall to zero, indicating normal channel operation mode.

Ken Blake can be reached at 209-957-5035.

Kathleen Karas of Crouse-Kimzey's Annapolis, Md., office showed me a piece of Andrew Corp.'s new quarter-inch, high-power superflex coax for STL connections.

You may be familiar with Andrew's FSJ1-50A superflex. The new product, ETS1-50T, has both high-power and plenum ratings. It comes in blue, which makes it easy to find in dark ceilings.

The small diameter and flexibility (one-inch minimum bending radius) makes this cable easy to snake around the inside contours of racks, eliminates the need for a right angle type "N" adapter on the back of the STL and

tolerates a number of reverse bends. If you are running a TSL along with your STL equipment, the superflex ends the coaxial maze usually found on a rack full of RF equipment.

It is not cheap at \$5 per foot, but this line is just what you need for inside STL RF cable runs, and to tidy up rack RF cabling. Kathleen can offer short samples of the coax, if you fax your request on company letterhead to Crouse-Kimzey of Annapolis 410-643-8888. If you'd prefer a data sheet, circle Reader Service 122.

★ ★ ★

Andrew Corp. is also providing data sheets on a new class of transmission line, the HRLine rigid coax. The new design eliminates troublesome inner conductor bullets. It is currently available in 6 1/8-inch, high-power sizes, although Andrew engineers are looking at the feasibility of 3 1/8- and four-inch versions.

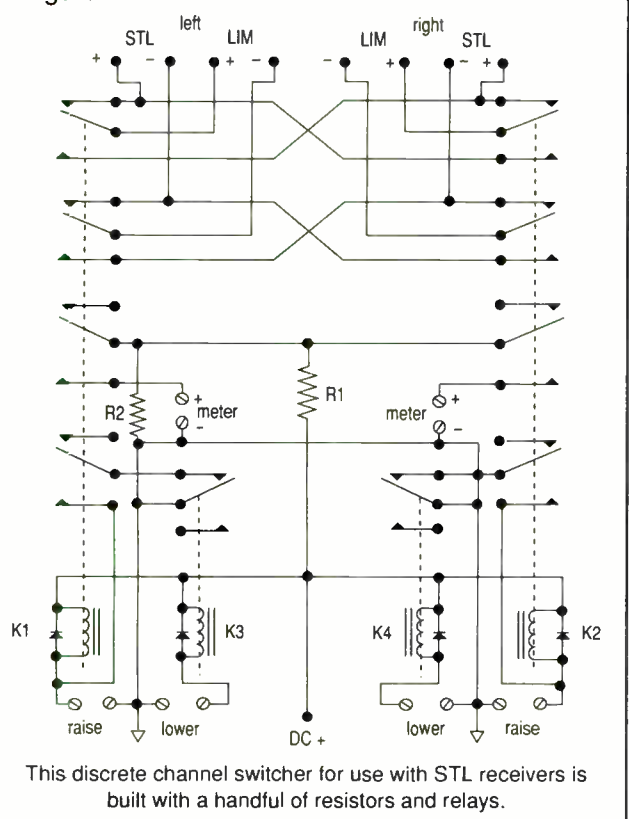
The new design uses a semi-flexible corrugated inner conductor that features a patented bolted inner joint at the flanges, which doubles the life of a transmission line system. For more information, circle Reader Service Number 138.

★ ★ ★

One final STL suggestion comes from Phil Wells, chief engineer at KJQY(FM) San Diego.

continued on page 41 ▶

Figure 1.



(Ken has seen many stations during a broadcasting career that started in the mid-1930s. He has served as a chief engineer for both radio and television and a field service engineer for Collins.)

One of the selling points of a discrete system is that there are two transmitters and two receivers. If a receiver or a transmitter fails, the station can operate in

SUBSCRIPTION/READER SERVICE FORM	
<h3>Radio World</h3> <p><b>FREE Subscription/Renewal Card</b></p> <p>I would like to receive or continue receiving Radio World FREE each month. <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Signature _____ Date _____</p> <p>Please print and include all information:</p> <p>Name _____ Title _____</p> <p>Company/Station _____</p> <p>Address _____</p> <p>City _____ State _____ ZIP _____</p> <p>Business Telephone ( ) _____</p> <p>Please circle only one entry for each category:</p> <p><b>I. Type of Firm</b></p> <p>D. Combination AM/FM station    F. Recording Studio</p> <p>A. Commercial AM station        G. TV station/teleprod facility</p> <p>B. Commercial FM station        H. Consultant/ind engineer</p> <p>C. Educational FM station        I. Mfg. distributor or dealer</p> <p>E. Network/group owner         J. Other _____</p> <p><b>II. Job Function</b></p> <p>A. Ownership                      G. Sales manager</p> <p>B. General management          E. News operations</p> <p>C. Engineering                    F. Other (specify) _____</p> <p>D. Programming/production</p>	
<p><b>Reader Service</b></p> <p>Feb. 9, 1994                      Use until May, 9, 1994</p> <p>Please first fill out contact information at left. Then check each advertisement for corresponding number and circle below.</p> <p><b>Purchasing Authority</b></p> <p>1. Recommend    2. Specify    3. Approve</p> <p>001 023 045 067 089 111 133 155 177 199</p> <p>002 024 046 068 090 112 134 156 178 200</p> <p>003 025 047 069 091 113 135 157 179 201</p> <p>004 026 048 070 092 114 136 158 180 202</p> <p>005 027 049 071 093 115 137 159 181 203</p> <p>006 028 050 072 094 116 138 160 182 204</p> <p>007 029 051 073 095 117 139 161 183 205</p> <p>008 030 052 074 096 118 140 162 184 206</p> <p>009 031 053 075 097 119 141 163 185 207</p> <p>010 032 054 076 098 120 142 164 186 208</p> <p>011 033 055 077 099 121 143 165 187 209</p> <p>012 034 056 078 100 122 144 166 188 210</p> <p>013 035 057 079 101 123 145 167 189 211</p> <p>014 036 058 080 102 124 146 168 190 212</p> <p>015 037 059 081 103 125 147 169 191 213</p> <p>016 038 060 082 104 126 148 170 192 214</p> <p>017 039 061 083 105 127 149 171 193 215</p> <p>018 040 062 084 106 128 150 172 194 216</p> <p>019 041 063 085 107 129 151 173 195 217</p> <p>020 042 064 086 108 130 152 174 196 218</p> <p>021 043 065 087 109 131 153 175 197 219</p> <p>022 044 066 088 110 132 154 176 198 220</p>	
<p>Copy &amp; Mail to: Radio World, PO Box 1214, Falls Church, VA 22041, or FAX to: 703-998-2966</p>	

## CCA Broadcast Transmitters

The Standard for Reliability Throughout the World.

**Available FM Transmitters:**

- 2.5 KW 20 KW
- 4 KW 25 KW
- 5 KW 27.5 KW
- 8 KW 35 KW
- 10 KW 45 KW
- 12 KW

**NAB Booth 4220**

# CCA

**CCA Electronics, Inc.**  
 P.O. Box 426 • 360 Bohannon Road  
 Fairburn, Georgia USA 30213  
 (404) 964-3530 • FAX: (404) 964-2222

30 YEARS

Circle (53) On Reader Service Card



# Products & Services Showcase

For more information on the products shown below, circle the appropriate Reader Service No. (s) on the enclosed Subscription/Reader Service card or contact the advertiser directly.

## S.C.M.S., Inc. Charlotte, N.C.

Low Prices – Experienced Staff  
New and Re-built R.F. and Audio

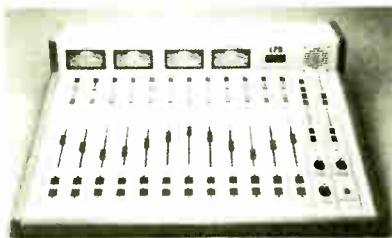
**THIS MONTH'S SPECIAL**  
**NEW GOLDLINE DIGITAL RTA**  
**MODEL DSP-30 \$1,395.00**

**85dB window - 8 scales -  
peak hold mode**

Toll-Free 800-438-6040  
FAX 704-889-4540

READER SERVICE NO. 66

## The LPB 7000 Series Stereo Consoles



### Standard Features:

- |                      |                     |
|----------------------|---------------------|
| 12 or 18 channels    | Full VU metering    |
| 2 inputs per channel | Timer               |
| 3 stereo busses      | Programmable Muting |
| 1 Mono Mixdown       | & Remote Starts     |
| Talkback             | And Much More       |

Contact **LPB**® at

28 Bacton Hill Rd, Frazer, PA 19355, USA  
Phone: 215-644-1123  
FAX: 215-644-8651

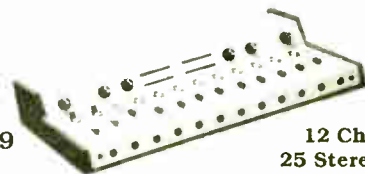
READER SERVICE NO. 20

## EVEN THE BEST CAN BE MADE BETTER

Introducing the new

### MINI-MIX 12A

THE COMPACT MIXER WITH A  
COMPACT PRICE FROM THE  
QUALITY LEADER



\$3499

12 Channels  
25 Stereo Inputs

Service & Affordable Quality for Over 23 Years

## AUTOGRAM CORPORATION

1500 Capital Avenue (214) 424-8585  
Plano Texas 75074-8118 1-800-327-6901  
FAX (214) 423-6334

READER SERVICE NO. 194

The Russians never  
abandoned tube  
technology . . .

## And that's great news for your transmitter!

As the world's largest power tube  
manufacturer, Svetlana never  
stopped full-scale R&D for power  
tubes. From power tubes of over  
one-megawatt to a full line of  
high-performance triodes,  
tetrodes and pentodes, Svetlana is  
the world leader in power tube  
technology.



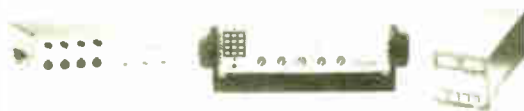
Now, Svetlana-developed tubes  
are available in the West in a  
growing number of standard tube  
types for AM and FM broadcast.  
These top-quality, long-life  
ceramic tubes are available at  
Russian prices direct from  
Svetlana and are backed by the  
most generous warranty in the  
industry.

Talk to Svetlana today about  
your requirements for standard  
and custom-designed power  
tubes. Broadcasters, call 800-  
239-6900 for sales; OEMs,  
distributors and volume purchas-  
ers, call 415 233-0429.

Broadcasters, contact:  
8200 S. Memorial Parkway  
Huntsville, Alabama  
35802  
800 239-6900

OEMs, Distributors, Volume  
Purchasers, contact:  
30110 Alpine Road  
Portola Valley, California  
94028  
415 233-0429

READER SERVICE NO. 76



If you see it in the  
pages of Radio World,  
we can finance it for you!



Assisting you with all your  
new & used equipment needs.

**PLC** 1-800-999-9546  
(ext. 132)  
Priority Leasing Corporation

READER SERVICE NO. 7

## WIRELESS IFB SYSTEM

Used by hundreds of TV stations for  
van-to-field cueing in ENG & SNG  
applications. Transmitter provides  
mix of program and instructions to  
rugged, pocket receivers.

- 100% duty cycle
- Wideband audio
- Excellent operating range



**COMREX**®

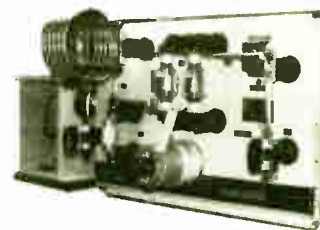
Comrex Corp., 65 Nonset Path, Acton MA 01720  
Tel: 1-800-237-1776 Fax: 508 635-0401

READER SERVICE NO. 145

## Omega Scientific Corporation

### RF MATCHING NETWORKS

Phasors,  
Diplexers,  
ATU's  
Intercept  
Filters



Custom Design and/or Manufacture  
Call or FAX for RFQ info sheet

Ph: (210) 599-0789

FAX: (210) 599-0799

4246 Gate Crest, San Antonio, TX 78217

READER SERVICE NO. 43

## ARE YOU LOOKING FOR A COST EFFECTIVE ALTERNATIVE TO MANUFACTURER SERVICE?

### SERVICE, REPAIR & CALIBRATION

- STL's • RPU's • TSL's
- Exciters • AM/FM
- Broadcast Monitors •
- Remote Control Systems

### SPECIALIZING IN EQUIPMENT BY

- Belar • Marti •
- Moseley • McMartin
- TFT • And others...

➤ An authorized  
TFT service center

### IN CASE OF EMERGENCY

We can help get you back on the air with our  
STL Loaner Program. We have STL's available that  
will be set to your frequency prior to shipping. We also  
provide over-the-phone technical assistance.



2198 Hubbard Lane, Grants Pass, OR 97527

**(503) 471-2262**

READER SERVICE NO. 30



## ROOTS OF RADIO

# Storz Music Formula Rescued Radio

by James T. Wold

**OMAHA, Neb.** As commercial TV spread across the country in the 1950s, radio listening dropped. Radio was forced to make transitions into new forms of programming and found its future as a specialized medium. Many stations dropped their network affiliations and were faced with more hours than they knew how to fill.

Robert Todd Storz became the prototype of the enterprising radio programmer, who showed stations how to forge their own identities by developing new music formats to reach targeted audiences.

## The rocking '50s

Before stations began segmenting and relabeling themselves as "country & western," "classical" and "middle-of-the-road," the air was filled with happy

sounds and upbeat announcers. But in the background radio was a more competitive business, and stations played the game with deadly earnest. Stations survived on whatever new approaches their operators could find.

Rock 'n' roll music swept the country in this atmosphere. A group called Bill Haley and the Comets had the most-played record on radio in the country in 1955 with a song called "Rock Around the Clock."

Disc jockeys began speaking in unnatural tones with a strange new jargon, involving "mounds of sound," "piles of platters" and "stacks of wax." In all the excitement, radio picked up youthful new listeners who would be the medium's salvation.

The chief purveyor of the new sound was the Top 40 station, invented in Omaha, Neb., by two programming innovators, Todd Storz and Bill Stewart.

Storz entered broadcasting as an advertising salesman. In 1949, he heard that an ailing station, KOWH(AM) Omaha, was on the block and the eager, young entrepreneur persuaded his father, Robert, to advance him the money to buy it.

The two of them formed Mid-Continent Broadcasting Co., which would later acquire WTI(AM) New Orleans, WHB(AM) Kansas City and WDG(AM) Minneapolis. Within six years, the 32-year-old Todd Storz multiplied an initial \$50,000 investment (\$20,000 of his own and \$30,000 of his father's money) into six radio stations worth an estimated \$2.5 million.

## Watch and listen

As he was building his company, Storz spent a lot of time shooting pool and drinking beer in the local bar with his programmer, Stewart. The jukebox was the center of entertainment at this establishment, and bars all over the country.

Storz and Stewart observed bar patrons as they selected jukebox tunes. Night after night, customers would wear a path from their bar stools to the machine, to insert nickels and punch in their favorite tunes. They would play the same few songs over and over.

As the bar closed, the waitresses would take their tip money to the jukebox to play the same records one more time.

Storz and Stewart began refining their KOWH playlist to rank the most popular songs and made sure that the most popular songs were repeated over and over.

The Top-40 formula was a rapid success. KOWH went from number seven out of seven Omaha stations in the Hooper ratings to number-one by May 1956, with 48.5 percent of the afternoon audience. The nearest competitor drew only 20.4 percent.

## WORKBENCH

► continued from page 39

An earlier "Workbench" reported a modification to the PCL-606 which forced the metering channel to stay in position No. 3 (RF signal). The problem is that any power bump or failure causes the metering channel to jump back to position No. 1 on power-up. If the RF signal output is monitored by remote control and power is lost, an incorrect reading on the remote control could send you in search of a nonexistent problem.

The proper signal is always coupled into the remote control when the remote metering output of the PCL-606 is engineered to always come up in the RF signal position.

Phil took this a step further by developing

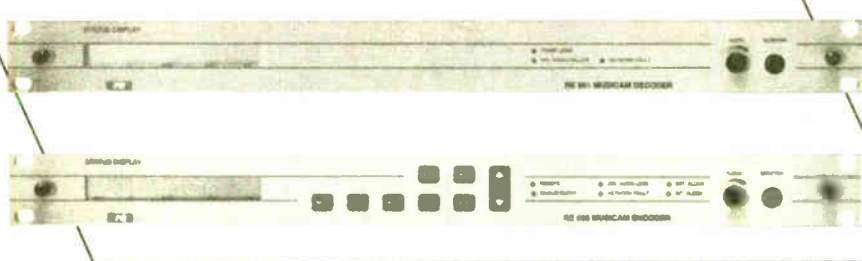
a one-person STL alignment procedure. He feeds the PCL-606 receiver metering signal into his Gentner VRC-2000 "talking" remote control. When he's up on the roof of the studio aiming the STL dish, he uses a portable cellular phone to hear the relative signal strength at the receiver.

Phil Wells can be reached at 619-238-1037.

□ □ □

*John Bisset is a principal with the contract engineering group Multiphase Consulting. Submissions to Workbench can be sent to his attention, in care of RW, or faxed to 703-998-2966. Published submissions qualify for recertification credit for all SBE certification levels. He can be reached at 703-323-7180.*

## THE SIMPLE SOLUTION FOR DIGITAL AUDIO TRANSPORTATION



- ▲ MUSICAM ISO/MPEG Layer 2, 2A
- ▲ Switched 56, 64 kbit/s, ISDN, Fractional T-1
- ▲ User data channel from 300-9600 baud
- ▲ Easiest set-up locks to network or internal clock
- ▲ Fully automatic decoder reduces operator set up

- ▲ Multiplex or redundant two times 56/64 for 112/128 kbit/s
- ▲ Mono, Dual Mono, Stereo, Joint Stereo operation
- ▲ AES/EBU and SPDIF digital interface *included*
- ▲ Two-times V.35, X.21 or RS 422 interface *included*
- ▲ Headphone monitor *included*

The RE 660/661 MUSICAM Digital Audio Codec was developed to enhance MUSICAM technology, providing up to 20 kHz of audio bandwidth. From satellite networks to switched

56 telephone lines, the full-featured RE 660/661 is completely bit rate flexible up to 384 kbit/s.

Applications range from network program distribution to remote pick-ups for sports, concerts, special events, news gathering, STL back-up, audio backhaul, recording and post production studios.

When it comes to digital audio transportation, nothing comes close to the RE 660/661 for providing quality audio with hassle free set up. Backed by 55 years of experience in analog and digital audio products, the RE 660/661 is the simple MUSICAM solution for all your digital audio transmission needs.

Available through Harris Allied and Broadcasters General Store



RE AMERICA, INC.  
31029 Center Ridge Rd. ▲ Westlake, Ohio 44145  
Phone: (216) 871-7617 ▲ Fax: (216) 871-4303

To keep the format fresh, Storz began devising promotions and cash giveaways. In response, Time magazine called him "the fastest rising figure in U.S. radio," and a man whose "low estimate of listeners' intelligence is tempered only by his regard for their cupidity."

In the same article, Storz is quoted as saying: "Our formula is good as long as radio is good—and we think radio is good forever."

□ □ □

*James T. Wold is a free-lance writer based in Minnesota. He is author of "Minnesota Microphones," published by Northstar Press. Wold can be reached at 1106 South Seventh St., Minneapolis, MN 55415.*



## LMA/DUOPOLY CONTOUR MAPS

The DATAWORLD LMA/DUOPOLY Market Survey Contour maps present a precise electronic verification of overlapping and intersecting contours.

AM 5 mV/m and FM 3.16 mV/m City Grade contours are shown in full color, including transmitter site indicator. The map is supported with a printout showing all of the stations which appear on the map.

Daily updating of DATAWORLD'S AM and FM databases protects against errors and omissions.

### OTHER MAP OPTIONS

- SHADOWING (TERRAIN SHIELDING)
- CONTOUR COVERAGE
- POPULATION DENSITY
- ZIP CODE BOUNDARIES
- RECEIVED SIGNAL LEVEL
- SPECIAL REQUIREMENTS

## 1990 CENSUS

### WHO ARE YOUR LISTENERS?

### 1990 BUREAU OF CENSUS POPULATION COUNTING

- Comprehensive Ethnic and Demographic Data
- Ethnic/Demographic Data Available for Each Zip Code Within Coverage Area
- Age Analysis Reflected in Ethnic Breakout
- Resolution Increased to Block Level
- Percent of County Coverage Shown

### ETHNIC PIE-CHART DISPLAY

- Projects Ethnic Population in Multi-Color Pie Chart Form

dataworld®

800-368-5754 FAX: 301-656-5341



# Diodes Have Many Solid State Functions

**It Is Important to Know an Anode from a Cathode; Look for the Correct Markings Before Using Diodes**

This revised course offers an introduction to the theory and practical application of active electronic devices. The course will give examples of how the devices work as well as ideas on how to use them.

Continuing Education Units will be offered to all who register with Northern Virginia Community College. You will be required to read all of the articles and participate in an exam that will be mailed to you at the completion of the course. You can register for the class any time while the series is running in RW.

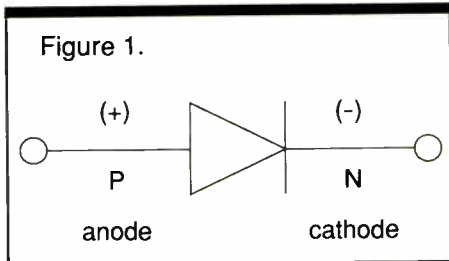
To register, contact the Community Education Office, Annandale Campus, 8333 Little River Turnpike, Annandale, Va. 22003. The fee for the course is \$30.

Please make every effort to secure all of the articles yourself. Northern Virginia Community College and RW are not in a position to supply readers with back issues.

by Ed Montgomery

Part III of VIII

**ANNANDALE, Va.** The PN junction (introduced in Part II, RW, Jan. 26) has a practical application in electronics. It is known as a diode (or rectifier) and is



used to convert alternating current to pulsating direct current. It is the basis for the power supply.

The word "diode" is a carry-over from the time of vacuum tubes when two discrete elements were required to make the device work. The positive side of the diode (or the P material) is the anode and the negative side (N material) is the cathode.

Figure 1 is an electronic schematic diagram of a diode.

Diodes are marked to show which side is the cathode. If there is still any question about the locations of the anode and cathode, testing with a multimeter will quickly clear it up. The leads of the meter will also tell you the condition of the diode.

When forward-biased, the meter will exhibit a little resistance. The reverse-biased reading will be infinite resistance. Most digital meters contain a diode checking function that will display this information. A reading of 0.6 to 0.7 indicates the approximate voltage drop across a silicon diode in the forward-bias direction.

Diodes are classified into two groups: "junction diodes," used in DC through microwave applications, and "point-contact diodes" used primarily in radio frequency applications.

Within the point-contact diode class are: "Zener" diodes, designed to "clamp"

junction in the same manner as a capacitor, permitting it to function like a capacitor.

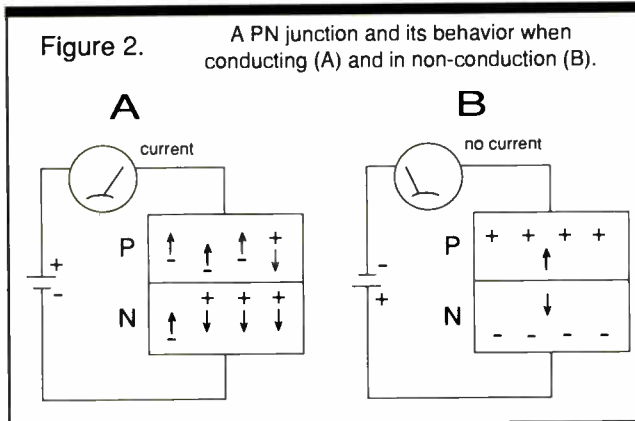
A solid state diode is not perfect. Part II illustrated that semiconductors have minority current flow, a small portion of electrons flowing opposite to the majority of the current flow.

Current characteristics are illustrated in Figure 4.

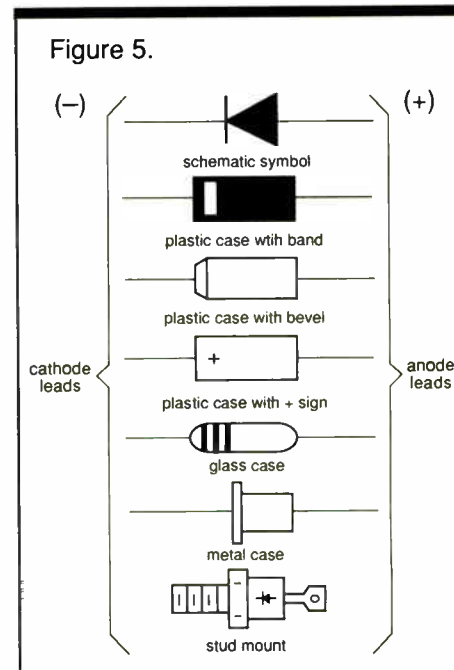
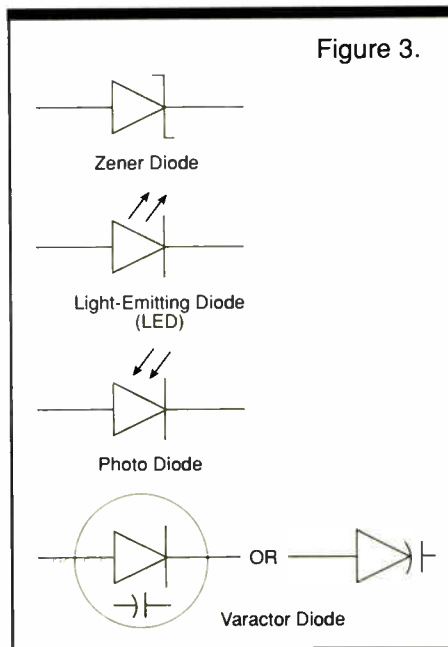
Current begins to flow when the barrier potential of the junction is overcome. This is the voltage potential necessary to force the electrons and holes together, reducing the device's resistance and permitting electron flow. When the device is reverse-biased, a very small amount of leakage current flows until the junction breaks down.

Both silicon and germanium diodes can be damaged with excessive forward or reverse current. It is important to know the characteristics of the devices before using them in a circuit. Diode manufacturers publish data about their devices and the operating parameters can also be found in reference books.

Maximum forward current indicates how much forward-biased current the



voltage at a specific limit: "light-emitting" diodes (LED), used more for display and communications purposes than for rectification, and "varactor" diodes, which use the charge built up around the

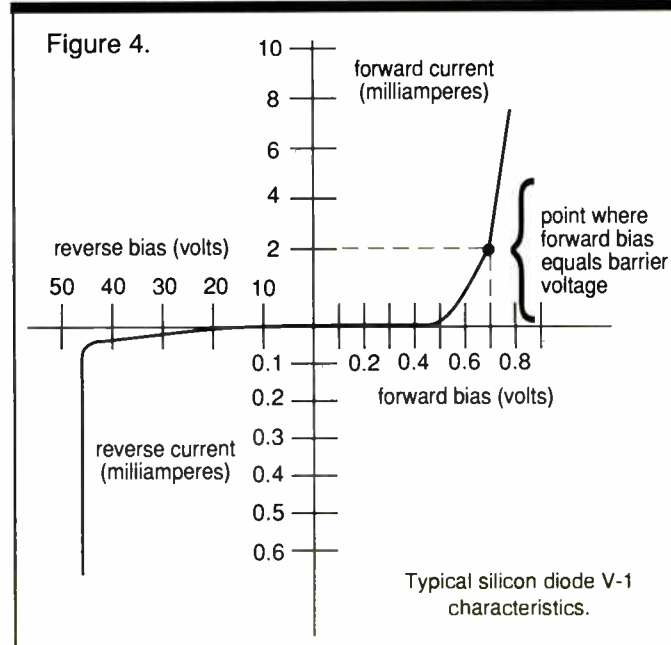


device can handle before it breaks down. Peak inverse voltage (PIV) indicates the maximum reverse bias voltage the diode can handle before it breaks down.

Figure 5 is an illustration of the various casings for solid state diodes. Note that

the cathode end is marked with a band or '+' sign, or the schematic diode symbol is stamped on the case, indicating polarity.

Ed Montgomery is a communications teacher at Thomas Jefferson High School for Science and Technology. He has taught broadcast engineering at Northern Virginia Community College and worked as a broadcast engineer for several radio stations. He can be reached at 703-750-5090.



## TRUE BLUE

# FOR THE VIEWS.

**Talk radio pros expect the unexpected, but there's one thing they can always depend on—the reliability of true blue.**

audiopak

P.O. Box 3100 • Winchester, VA 22601  
 Tel: (800) 522-CART or (703) 667-8125  
 Fax: (703) 667-6379

BROADCAST CARTRIDGES



# Your Research Primer

► continued from page 12

decisions on tenth-of-a-point shifts in the Arbitrends, nor should the management team make decisions based on raw data.

## Interpret the data

Once the project is complete, how will you interpret the data? How do you parlay those results into increased ratings? The entire management team of the station should read the consulting firm's report cover to cover and understand it. Questions will be answered by your representative. It is imperative that you spend the time necessary to really understand what the numbers or answers to your survey questions mean.

Once you and your staff understand what your research means you can begin to plan moves to correct the prob-

lems uncovered. At this point, management technique comes into play. Is there a problem that needs immediate attention? A jock that might be better suited to another daypart? A song or group of songs that drive your audience crazy?

If any of the above, move carefully and decisively to make the changes necessary to alleviate your perceived problem areas. Make sure, however, that you incorporate results from the project into long-range planning so that your fine-tuning of the air-staff, the music or your contesting and/or positioning will have an overall positive effect on the station and enhance the

consistency of the format.

Look at the "big picture." How do the results of your research fit in with what you know about the market and its population? If you are doing perceptual research and you are a veteran of the market, there should be few major surprises. If there are, you and your management team need to take time to rethink your station's positioning, staffing or music.

If you are doing music research, be it call-out or auditorium testing, make sure you look at the results carefully before making major deletions or additions to your music rotation.

Even your research consultant will tell you that a research project is one of the tools in your programming/positioning arsenal and should not be used as an

excuse to fire your entire staff or change formats from classical to country-disco (now there's a new one).

Just as you do not make changes based on one comment on the back page of an Arbitron diary, you should not over react to what your research tells you.

A research project will help you assess the shortcomings or strengths of your station. It is not a quick path to becoming the No. 1 station in your market.

In Part II of this series, I'll talk about sources for free, accurate research information.

□□□

*Digitec Consulting is a full-service consulting firm for formats with an edge. For more information, contact either Bob Steele or Chris Kelley at 800-659-7789.*

*The following is a list of companies that provide research services for radio.*

### Bolton Research

Ted Bolton, President  
Paoli, Pa.  
215-640-4400; fax: 215-647-4623  
Or Circle Reader Service 63

### Coleman Research

Jon Coleman, President  
Research Triangle Park, N.C.  
919-571-0000; fax: 919-571-9999  
Or Circle Reader Service 139

### Core Call Out Research

Jodie Renk Reeb, Vice President  
Encino, Calif.  
818-986-0333; fax: 818-986-4333  
Or Circle Reader Service 51

### Hagen Media Research

Don Hagen, President  
Washington, D.C.  
703-534-3003; fax: 703-534-3073  
Or Circle Reader Service 18

### Mediabase Research

Rich Meyer, President  
Sherman Oaks, Calif.  
818-377-5300; fax: 818-377-5333  
Or Circle Reader Service 207

### Paragon Research

Roger Wimmer, President  
Denver, Colo.  
303-922-5600; 303-922-1589  
Or Circle Reader Service 99

### Rantel Research

David Tate, President  
Laurel, Md.  
301-490-8700; 410-880-4190  
Or Circle Reader Service 177

### The Research Group

Larry Campbell, President  
Seattle, Wash.  
206-624-3888; fax: 206-624-5086  
Or Circle Reader Service 215

### Strategic Radio Research

Kurt Hanson, President  
Chicago, Ill.  
312-726-8300; fax: 303-726-8383  
Or Circle Reader Service 37

### Symmetrical Resources Inc.

Bill Livek, Partner  
Deerfield Beach, Fla.  
305-427-4104; fax: 305-427-3760  
Or Circle Reader Service 4

## SEND YOUR AUDIO ACROSS THE STREET OR AROUND THE WORLD™

**When you think digital audio, think California Digital. We provide satellite/digital technology to make all these options available at low cost:**

- ▮ Syndicate your top personality or format
- ▮ Add affiliates - gain revenue sources
- ▮ Share programming, talent and costs
- ▮ Off-site announcer feeds
- ▮ Create events with remotes
- ▮ CD-quality live coverage of news, sports, and concerts

### California Digital offers expertise in:

- ▮ Digital Satellite Networks - C or Ku
- ▮ Regional, National, International Nets
- ▮ Remote Broadcasts
- ▮ Rugged Fly-away Systems
- ▮ Custom Ku Power Control Software
- ▮ System Design & Engineering
- ▮ FCC Licensing; Installation and Training
- ▮ Equipment sales, leasing and financing
- ▮ Switch 56 & ISDN program distribution

**TOP TALENT IS LOCALIZING NATIONAL SHOWS WITH OUR LOW COST TECHNOLOGY**  
**ASK US HOW YOU CAN DO IT TOO!**

**CALL: CALIFORNIA  
DIGITAL AUDIO**

West Coast Office (805) 523-2310 Fax (805) 523-0480  
Midwest Office (612) 631-5064 Fax (612) 631-5010

**MAKE MONEY BY CREATING A  
MUSIC PROGRAMMING NETWORK!**

Circle (12) On Reader Service Card



OFFBEAT RADIO

# Hawaii Stations Head 'Em off at the Pass

by Dee McVicker

**HONOLULU** A radio station in Hawaii has taken a page out of the Old West, and begun forming posses to round up bad guys.

In 1990s Honolulu, however, KSSK-AM-FM listeners are the posse, and when the time for a quick draw comes, the wranglers reach for their cellular phones.

**Chance beginning**

The KSSK Posse started over a year ago when the morning team of Michael

Perry and Larry Price took a frantic call from a listener, who reported via his cellular phone that his car had just been stolen. Perry and Price immediately put a description of the car on the air, and reported sightings began pouring in from other listeners with cellular phones.

The Honolulu police used the KSSK information to pursue and apprehend the thief, and by the end of the morning a new feature had been added to the Perry and Price show. The Posse has since been used to track down other stolen

vehicles, bank robbers and purse snatchers.

"It's kind of a mobile neighborhood watch program," said Suzi Mechler, director of operations for KSSK-AM-FM. (The morning program is simulcast on AM and FM.) "People, I think, are really tired of feeling like they can't do anything."

In one case, a purse snatcher was caught after KSSK callers led the police right to where the thief was hiding.

"This guy ripped off this woman's purse in the parking lot of supermarket," Mechler said. "She called us with the description of the van and a description of the guy. We tracked him. By the time the guy pulled into a little lane, the police were right on his tail."

Another time, KSSK helped find a lost Alzheimer patient who had absentmindedly strolled away from his home.

**Using numbers**

In the KSSK Posse's first year, it has found 10 stolen cars and nabbed several thieves. The program works, Mechler said, because Perry and Price, already a popular morning team before the Posse, are able to get so many listeners involved.

"You have to do it with a large audience. Any other time than our morning show would not have the sheer numbers that you really need," she said. The morning show consistently posts more than 30 percent market share, "which really helps when you want to get some-

thing accomplished."

The Posse does have its limits. KSSK does not air some calls where a city-wide watch is unlikely to yield results, such as when a car has been missing for 24 hours. "We want to take it only if we feel we can be successful," Mechler said.

KSSK's staff is well aware of the potential dangers to listeners who get involved when a crime is taking place. The morning team stresses that listeners reporting sightings should stand back

**The Posse has been used to track down stolen vehicles, bank robbers, purse snatchers and missing persons.**

and let authorities take over.

All information gathered by the Posse is immediately forwarded to the Honolulu police. Crime victims are also encouraged to report crimes directly to the police.

But the immediacy of radio and cellular phones often allows the Posse to react more quickly than a police dispatcher. In one case, the dispatcher told patrolmen searching for a stolen car to tune to KSSK for the latest reports.

The story ended with the thief's arrest by an off-duty officer, who happened to be listening to the station.

**Recognition**

The Honolulu Police Department recently commended KSSK and its listeners for their assistance in solving

continued on page 48 ▶

Be Prepared With The  
**ParaTool**<sup>®</sup>

Only \$60.95\*

A GREAT GIFT!

\*plus \$4.00 for surface shipping in the U.S.A.

**Radio World**

**TOOLS of the TRADE**

Charge your purchase via fax with your Visa or Mastercard.  
Fill in this form and fax to **703-998-2966**  
(no CODs or collect calls please)

CREDIT CARD SALES FORM (Please Print Clearly)

ITEM	QUANTITY	PRICE	TOTAL
Paratool			\$

CARD NUMBER \_\_\_\_\_

EXPIRATION DATE \_\_\_\_ / \_\_\_\_ CHECK ONE:  MASTERCARD  VISA

NAME ON CARD: \_\_\_\_\_

BILLING ADDRESS \_\_\_\_\_ Country \_\_\_\_\_

AMOUNT \$ \_\_\_\_\_

SHIPPING INFORMATION:

NAME: \_\_\_\_\_

ADDRESS: \_\_\_\_\_ Country \_\_\_\_\_

PHONE: \_\_\_\_\_ FAX: \_\_\_\_\_

Or to order by mail, send the completed form to:  
**Radio World Tools of the Trade**, P.O. Box 1214, Falls Church, VA 22041 USA

RW173

## CBC Shows on Internet

▶ continued from page 3

Still, Patrick said, Internet users are calling in. "We keep logs of who is using this, and what the logs show is we're getting hundreds and hundreds of users everyday throughout Canada, the U.S.—all over the world."

To date, what these people are getting are just sample programs (though going through Internet saves on long distance charges such as those if users called the CRC directly from their telephones).

**Daily access**

But soon, if everything goes according to plan, they also will be able to get daily access to one of CBC Radio's major newscasts, a weekly episode of "Quirks and Quarks" (which frequently covers topics of interest to computer users) and french-language programming, foreign language programming from Radio Canada International and eventually, archival material, according to Michael McEwen, CBC Radio's senior vice president of radio services.

To do this, of course, CBC will need a much faster link to Internet than CRC's 56 kbps connection, which is at the bottom end of Internet transmission speeds.

That is why the CRC will be mirroring its CBC sound files (to be made by recording programs live off-air) to Internet Multicasting Services (IMS) in Washington, D.C.

On-line since April 1993, IMS is a non-profit experimental "cyberstation." It inputs not just audio (such as luncheon speeches delivered at the National Press Club), but video and text into Internet using an ultra-fast 10 million bps connection. That represents the fastest link in Washington, with a capacity of 240 channels of audio in real-time on Internet.

The system is so fast that "when Al Gore gave his first speech about the electronic superhighway, we sent that out live, and people sitting at their computers sent comments back," IMS Executive Producer Carl Malamud said. "At the end of the speech, Vice President Gore was handed a floppy disk, and (we) said, 'Here's feedback from people around the world about your talk.'"

Eventually, the CBC plans to establish its own "node" on Internet, Williamson said, allowing it to broadcast as easily on Internet as it does over the air.

In doing so, it may well prove to be the first conventional broadcaster to harness the reach of Internet.

"We're here at the birth of a new medium," Malamud said. "This is like the early days of radio, or the early days of TV. And the action now is on the Internet."

□ □ □

James Careless covers the radio industry from Canada.





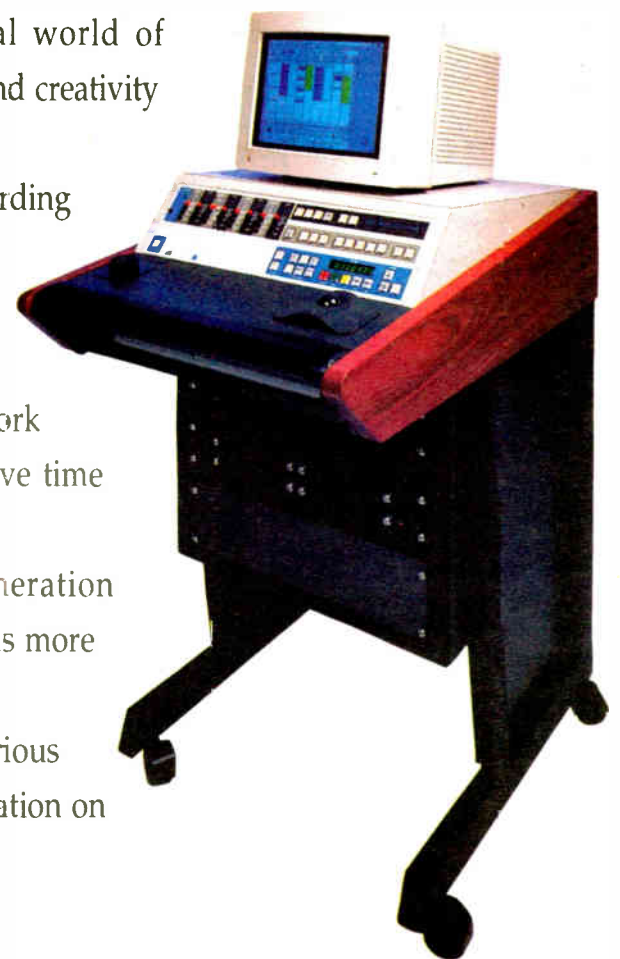
Introducing ADX, the first digital production system designed for the real world of broadcasting. A world where time is of the essence, change is the rule, last-minute is routine, and creativity is the competitive edge!

ADX is a fully integrated system which combines the creative flexibility of digital recording and editing with the speed and intuitiveness of a fully automated production mixer. Instead of simply storing audio elements and their edit decisions, ADX also recalls and recreates the mixing and processing talent of the producer.

Just imagine having the ability to precisely replay complex multitrack production work the way you mixed and equalized it yesterday, last week or last month! Think of the creative time saved when a change or update is requested in an otherwise perfect mix.

Plus, the ADX is unencumbered by the architectural limitations of first-generation workstations and is designed to grow and expand with your needs. Even the basic system has more standard features than anything before.

And like all PR&E products, ADX is a powerful tool optimized for the fast and furious demands of broadcasting and backed by world-famous PR&E support. Call today for information on ADX, the next generation of digital.



Pacific Recorders & Engineering Corporation, 2070 Las Palmas Drive Carlsbad, CA 92009  
Tel: 619-438-3911 Fax: 619-438-9277 GSA Contract: GS-03F-2057A

**DESIGNS THAT MAKE THE DIFFERENCE**



# WTUE Connects to Audience Via PC

by Tom Carroll

**DAYTON, Ohio** As with all program directors, my first concern is reaching as many listeners as possible, especially the 18-to-34-year-old age group so sought after by advertisers.

The best way to succeed is to be unique and targeted. But the age bracket that I just mentioned is becoming an increasingly difficult group to reach. People in their late teens and early twenties are more fractured and divided in their interests than ever before.

Musically, this group listens to rap, grunge and country—all formats with which WTUE(FM)'s classic rock-based format, consisting of the likes of Led Zeppelin and Pink Floyd, must compete. In addition, 18-to-34-year-old listeners also devote attention to everything from MTV to SEGA video games. At a fundamental level, radio just might not be as important to this generation as it has been to others.

But there is a common ground that bonds this so-called "Generation X" like nothing else: This age group is the first ever to grow up computer-literate, having used computers for most of their lives. Strange as it may seem, in this fact lies a strong mutual relationship between computers and radio.

For two years now I have been running the WTUE-FM 104.7 Bulletin Board, to act as an extension of our radio station. It has been very successful, and I believe it

represents a broad range of possibilities for all radio stations, cutting through formats and age boundaries.

All one needs to set up a BBS is a computer, a telephone line, a modem and the appropriate software. At WTUE, we use the WILDCAT! BBS software from Mustang Software Inc. of Bakersfield, Calif. Anyone with a computer and modem can call into the Bulletin Board and leave or retrieve electronic mail.

In case this sounds terribly high tech, let me reassure you it's not. I had never used a computer, and never thought that I ever would until a friend bought one in mid-1991. I began to tinker with it, and one day an engineer at the station gave me an old modem, telling me my life would never be the same.

Soon I had discovered the world of BBS: there are more than 200 in Dayton alone operated by various businesses and hobbyists. After that my friend had a lot of trouble using his own computer. Bulletin board services were like a secret, underground world, and the amount of information and conversation available fascinated me. It became apparent to me that there just had to be an application for a bulletin board in conjunction with the radio station.

When I started the WTUE FM 104.7 BBS on Halloween night 1991, I still was unaware of what the reception might be.

However, the BBS was an immediate success: we received 35-40 calls per day during weekdays and more on the week-

ends. So far, I estimate that 700 active users participate on a frequent basis. Most of that activity is from the Dayton area, but we get calls from all over the country. One user even calls daily from Palm Springs, Calif.!

On some levels, the BBS is just an extension of normal radio functions: People can play games and win prizes on it, or they can call for information about concerts. Callers can converse with one another, request songs, make suggestions regarding format, download a station newsletter, and much more.

The challenge for me is to keep the BBS fresh and localized. I do this by adding times and files that the state and nationwide press usually leave out, such as the basketball schedule for the University of Dayton, or concert listings for the smaller concert clubs in the area.

Over time, a picture of our average BBS user emerged—younger and smarter, independent but still desiring the sense of community radio offers. And the success of the BBS has resulted with almost no advertising or on the air announcements. The callers have gone out on their own, found our BBS via random searching for interesting bulletin boards, and continued to call in regularly.

This puts WTUE in a great position. There is no paid advertising on the BBS, so no money is made on it. It's just meant to be entertaining, educational and useful. It's also great public relations.

Every time someone calls onto the BBS, they have to look at my call letters. Even when people listening to other stations call in—sometimes using other station's call letters as their passwords—they still look at our call letters. So people who have never even heard or rarely listen to the station have a positive image of it. As for those who already listen, it continues to strengthen the identification among our listeners.

With the bulletin board, the visibility of the station is enhanced, as is its reputation for reaching out to the community. It also gives us the appearance of being cutting edge, which is especially important when some people think of classic rock as pure nostalgia.

But besides good public relations, I want the WTUE bulletin board to provide overall fun, and to restore a sense of community so vital to radio. As far as I am aware, we are the only rock station currently offering a system such as this, even though I know some stations have called in to check out what our BBS is all about.

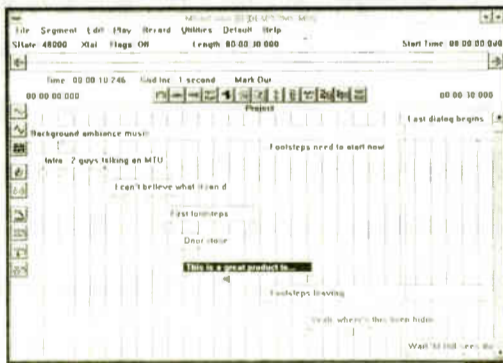
The competition for radio station listenership isn't going to go away, and, by the same token, future generations aren't going to be using computers any less. Who would have thought that a computer might kick-start some life into radio, cutting across formats, age and other barriers? It is truly exciting that a grassroots phenomenon like this is taking place, and that an audience doesn't have to be hit over the head with a message. If you upload it, they will come.

□ □ □

Tom Carroll is program director for WTUE 104.7 FM in Dayton, Ohio.

# 50 DIGITAL STEREO TRACKS UNDER \$4,000!

## ~And We'll Prove It!



Plays 50 simultaneous stereo tracks without bouncing!

- Add to your 386/486 computer
- Up to 2,900 segments available per project
- Non-destructive, precision digital edits in under a second
- -110 db noise floor & phase-linear filters
- Non-brittle, crystal clear sound quality
- Backs up to audio DAT
- Easy to install, easier to use!

"Excellent sonic quality... incredible freedom"  
EQ Magazine, October 1993



Complete Work Stations Available!

Call For Your Free Catalog Today!

**919/870-0344**

**FAX/870-7163**

**MICRO SOUND**  
Digital Audio Workstations



Micro Technology Unlimited • P.O. Box 21061 • Raleigh, NC USA 27619-1061

Circle (14) On Reader Service Card

World Radio History



# The Best Way to Hear from There

**Only Zephyr™ gives you full-fidelity stereo on a single phone line.**

No longer will your outside broadcasts be constrained by high cost and complicated equipment. Now all of your remotes can have near-CD quality sound. Using Integrated Services Digital Network (ISDN) telephone lines and the most advanced digital audio compression technology available, Telos makes setting up a remote as easy as sending a fax.

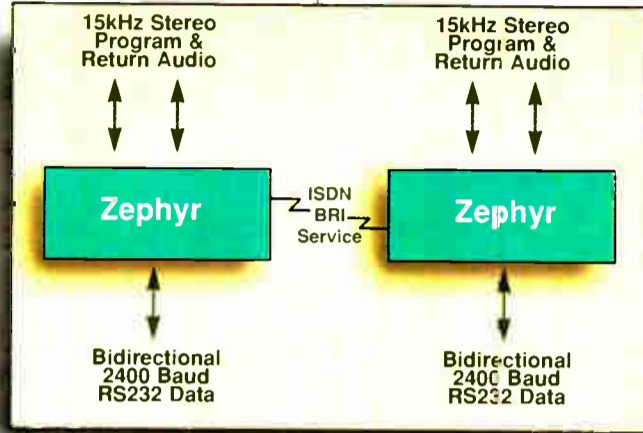
Zephyr is capable of transmitting broadcast quality audio virtually anywhere in the world for about the same price as an ordinary voice call.



It is the ideal solution for remote broadcasts, ad hoc networks, backup to microwave and satellite links, as well as many other applications.

To compress the program audio signal for transmission, Zephyr uses ISO/MPEG Layer III coding.

Several international listening tests have already demonstrated Layer III's superior performance at data rates of 64kbps or less per channel.

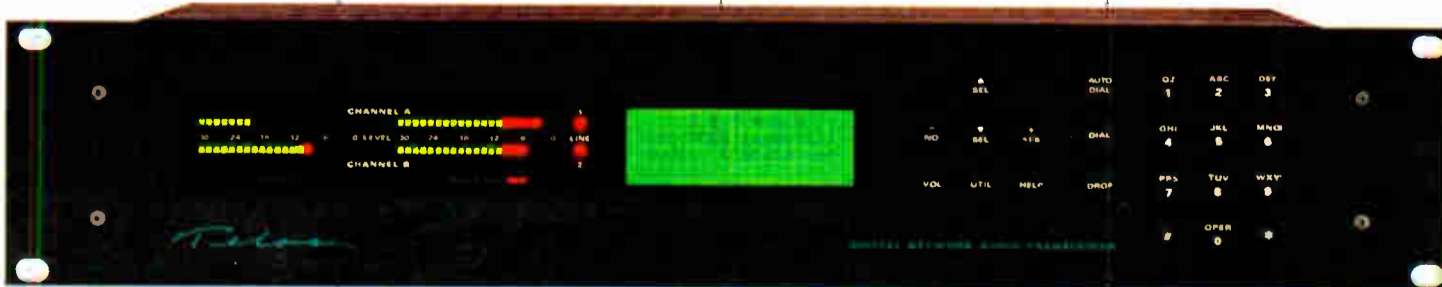


*only from*



2101 Superior Avenue  
Cleveland, Ohio 44114  
216.241.7225  
FAX: 216.241.4103

- Full duplex 15kHz stereo operation on one ISDN line or two Switched 56 lines using Layer III coding.
- Compatibility with older 7.5kHz codecs that use G.722.
- 2400 baud RS-232 bi-directional data for communications and control.
- Four "end-to-end" simple parallel contact closures for summary alarm and control of recorders and other devices.
- Split channel mode allows individual mono signals to be transmitted to separate sites.
- The ISDN terminal adapter is built-in and no separate boxes are needed.
- V.35/X.21 port allows Zephyr to be connected to one or two Switched 56 lines, spread spectrum wireless modems, satellite links, and other data paths.
- Designed for simple operation with full metering, analog audio limiting, and straightforward controls.
- Each unit can serve as either a transmitter or receiver.



**Telos Zephyr** DIGITAL NETWORK AUDIO TRANSMISSION

Circle (135) On Reader Service Card

World Radio History



## INSIGHT ON RULES

# Beware of the Long Arm of the FCC

by Harold Hallikainen

**SAN LUIS OBISPO, Calif.** I recently filed a Freedom of Information Act request with the FCC for all violation notices issued to radio and television stations in 1993, and related correspondence. Two previous requests each yielded about 3,000 pages of documentation, showing what the FCC is doing out there.

As soon as the commission acts on my request, I'll let you know about the latest fine and forfeiture trends I find.

In the meantime, I've recently come upon some interesting commission stories from local radio operators and from the FCC Record (my favorite paperback book).

Just before Christmas, I heard a local station running a contest where people were called at random, and their voices were broadcast or taped for later broadcast. Anyone answering the phone with "Merry Christmas" or "Happy Holidays" won a prize.

This station should watch out. From what I heard, no one was asked for permission to broadcast their voices, as required by Rule 73.1206.

Permission is required before airing or recording a conversation for broadcast. An exception is made if the conversation participants are aware or may be presumed to be aware that the conversation

is being broadcast, such as people calling a talk show or reporters and other station employees.

I often hear "morning zoo" or late-night television programs placing calls to unsuspecting people. These calls seem most likely to result in fines. But incoming calls can also be hazardous.

The FCC fined a Utah station \$5,000 for broadcasting a telephone conversation without first informing the participants. The FCC Record (8 FCC Red No. 19, page 6735) shows that the station's on-air personalities at a remote broadcast site took an incoming call, assuming that studio personnel had already informed the caller of the station's intention to broadcast.

In another case, a station was fined \$2,000 after a disk jockey aired a telephone call to another station's receptionist.

Another station was fined \$2,500 for on-air solicitation of funds to repair its storm-damaged tower so it wouldn't have to fire its disk jockeys. The FCC ruled that the station had used its license in a scheme for obtaining money by false or fraudulent pretenses (violating 18 USC Section 1343), because the storm damage was covered by insurance.

The station claimed the entire incident was a misunderstanding and that the announcements were only a joke. (The station actually raised \$98, which was donated to charity.) The FCC obviously

did not see the humor in the situation.

An FM station in Red Bluff, Calif., was fined for not maintaining its main studio within its 3.16 mV/m contour (7 FCC Red No. 16, page 4860). The station asserted that a "main studio" was maintained in the community of license, complete with program production and transmission capabilities. An FCC inspector visiting the site did not find those capabilities.

The station also claimed that its "auxiliary studio" was within the 3.16 mV/m contour, so even if the site it claimed to be the "main studio" was not in compliance, adequate studio facilities were located within the community of license.

In its reply, the FCC noted that the station had requested a studio-site change in 1990, which was denied: "It appears that having been unsuccessful in obtaining commission permission to locate your main studio in Chico, you nevertheless relocated it to that community, and when discovered, relied on the same arguments previously rejected."

The fine: \$10,000. It pays to be careful, and adhere to the letter of the FCC rules.

□□□

*Harold Hallikainen is president of Hallikainen and Friends, a manufacturer of transmitter control and telemetry systems. He also teaches electronics at Cuesta College, San Luis Obispo. He can be reached at 805-541-0200, or on internet at ap621@cleveland.freenet.edu.*

## KSSK Posse Is on Duty

► continued from page 44

crimes. There is no detailed data to show how effective the Posse has been in deterring crime, but Mechler suspects it has had a significant impact on morning crimes.

So KSSK intends to continue the Posse program "We want to keep this as a community service, and not tie it into an advertiser," Mechler said.

But some advertisers are getting involved in other ways. The island's two cellular carriers have provided lines to the station to report sightings, and in return they are mentioned in Posse promotions.

A local bank has pledged to donate \$500 to neighborhood crime watch programs for every crime the Posse solves.

The Posse provides something else to the community, Mechler said: "Something that a lot of people can immediately get involved in."

□□□

*Dee McVicker has been covering the broadcast beat for five years as a regular contributor to RW and as a free-lance writer for the broadcasting industry. She can be reached at 602-545-7363.*

## THE RF EXPERTS KNOW—MYAT DELIVERS

### MYAT DELIVERS QUALITY

You can rely on MYAT rigid line and components to deliver a clean, powerful signal to your antenna. Pure highest quality copper, brass and silver plus computer-aided design and manufacturing ensure consistency and accuracy. No wonder demanding broadcasters worldwide choose MYAT products for their passive systems. We take Quality Control very seriously.

### MYAT DELIVERS RELIABLE PERFORMANCE

Our non-galling silver-plated beryllium copper contact springs, brass elbow reinforcements and virgin Teflon inner supports are designed for maximum velocity, minimum attenuation and long service life. Every MYAT component is tested before shipping and backed with a full one year warranty. MYAT products are built for the long run.



### MYAT DELIVERS WHEN YOU NEED IT

Major transmitter manufacturers with strict production schedules rely on MYAT to deliver quality components on time and within budget. So do leading broadcasters like the Empire State Building's newest TV tenants. At MYAT, commitments are kept.

### LET MYAT DELIVER FOR YOU

Whether you're planning a new tower, upgrading an older installation, or coping with an emergency, you can depend on MYAT rigid line and components. Thousands of RF experts around the world already do. Contact your RF distributor, or phone us for our catalog, installation planning guide and engineering reference. Its detailed drawings can help you put together an efficient, trouble-free transmission line that will last for decades. For a free copy call 201-767-5380 or fax 201-767-4147.

### RIGID LINE: RADIO'S EFFICIENT CHOICE

40 YEARS OF EXPERIENCE. 40 YEARS OF EXCELLENCE.

380 Chestnut Street • P.O. Box 425 • Norwood, NJ 07648

Tel 201-767-5380 • Fax 201-767-4147



# RadioWorld

## Broadcast Equipment Exchange

"Broadcast Equipment Exchange" accepts no responsibility for the condition of the equipment listed or for the specifics of transactions made between buyers and sellers.

### RADIO RESOURCES

CALL US TO RECEIVE YOUR COPY OF THE NEW TECHNICAL NECESSITIES CATALOG

PRE-OWNED EQUIPMENT CURRENTLY AVAILABLE:

QEI 500W Amplifier  
Gentner TC-100-RRT  
Belar RF Amp & FM Monitor  
Burk Technology Remote Control  
Eventide Delay & Harmonizer  
ITC Series 1 R/P Stereo  
Potomac FIM-41  
And Many Other Items.....

PRE-OWNED EQUIPMENT ITEMS WE NEED:

AM/FM Transmitters  
Optimods  
Field Strength Meters  
STL & RPU Equipment  
Otarl MX 5050 Bll Reel to Reels  
Plus Many Other Items....

TEST EQUIPMENT AVAILABLE TO RENT:

Potomac Field Strength Meters  
Delta Impedance Bridge  
Delta Receiver/Generator  
Tektronix Spectrum Analyzer (for AM splatter measurements)

Call Steve or Chuck  
**1-800-54-RADIO**  
**1-410-783-4635 FAX**

Circle (2) On Reader Service Card

**Radio World**  
Broadcast Equipment Exchange

...A great place to advertise!

Call Simone at  
**800-336-3045**  
for information

### ACOUSTICS

Want To Sell

**STUDIOFOAM**  
SOUND ABSORBENT WEDGES  
TESTS UP TO 40% BETTER THAN SONEX  
COSTS LESS • BETTER COLORS • BETTER CUT

**SONOMATT**  
4X8X2" Sheets \$29.99 Ea. In Pairs NRC 70-Steps UPS

**VENUS**  
12" x 2' x 4' NRC 1.30 Flat 10K-125Hz  
Then They Really Kick In (125Hz NRC)

**BASS TRAPS**  
1.631" Charcoal Gray 2 For Just \$150!!

USA Foam Box 20384-Indiana IN 46220-017251-2992

**1-800-95-WEDGE**

Circle (94) On Reader Service Card

### AMPLIFIERS

Want To Sell

Ampex 620 2 rack mount, one in original case. V Coleman, WXTK, 278 S Sea Ave, W Yarmouth MA 02673. 508-775-7400.

Crown D-75 studio amp, less than year old, hardly used, \$275. B Rice, WEVO, 207 N Main, Concord NH 03301. 603-228-8910.

RCA & LPB phono preamps, RCA for \$50 & LPB for \$75. V Coleman, WXTK, 278 S Sea Ave, W Yarmouth MA 02673. 508-775-7400.

Stanton 310 preamp, \$100. L Schmitz, Soundtrax, 8116 Brucar Ct, Gaithersburg MD 20877. 301-948-4288.

Datatek D525 stereo dist amps with frame (10), \$2950 plus shipping; frame with (6) Datatek D525 stereo dist amps, \$1750 plus shipping. H Frost, WSPR, 195 High St, Holyoke MA 01040. 413-584-6280.

RTS-405 stereo TT preamp (2), \$145/ea + shpg, used 6 mths. B Lord, Lord Bldg, 13313 SE 208th St, Kent WA 98042. 206-631-2374.

Perma-Power S-102 amp with \$1420 battery pack, mobile/portable PA unit, 12 W out, excellent condition, \$4100. R Sumner, CAVU Corp, 3322 Applegate Ct, Annandale VA 22003. 703-968-8894.

New 10 kW amplifier under \$24,000. Call for details. Bill Hoffman, 518-743-1601.

Want To Buy

LPB RB-1 linear amp & FMS-2500 FM stereo modulator, must be in working cond in need of minimum repairs. G Phillips, WLNC, POB 925, Laurinburg NC 28353. 910-276-0000.

### WANTED:

Pultec EQ's; Fairchild, Teletronix, dbx, UREI, Sontec Limiters. Neumann, Telefunken, AKG and RCA mics. MacIntosh or Marantz Gear; Lang, Neve and API gear. Misc old tubes and guitars.

**DAN ALEXANDER AUDIO**

1340 Mission Street  
San Francisco, CA 94103  
(415) 252-7102  
FAX: (415) 252-7524

### ANTENNAS/ TOWERS/CABLES

Want To Sell

Andrew 78 ARM EIA flanged connector for 3" Heliax, \$175; Andrew splice for 3" Heliax, \$250; Cablewave EIA flanged connector for 3" Heliax, \$175. A Chatman, WXC V, POB 1408, Crystal River FL 32623. 904-795-7220.

### FM - ANTENNAS

Designed and built for your frequency. Choose from 1 to 12 bays and five power levels. Financing available. Call Jimmie Joynt at S.W.R. **214-335-3425**

ERI FM7AE 7-bay HP 1987 model w/deicers, 100.3 MHz. J Zicherie, WISM, 1819 Mitchell Ave, Eau Claire WI 54701. 715-836-9476.

Andrew HJ9-50 5" air dielectric, 500' on spool with connectors on I-80 Central Iowa, \$8000. R Henry, WPIO, 505 Josephine St, Titusville FL 32796. 800-326-8890.

ERI FML-3 3 bay tuned to 95.9, \$1000. F Troiani, WMRF-WIEZ Radio, 12 1/2 E Market St, Lewistown PA 17044. 717-248-6757.

Jampro JSLP 6 bay on 97.9 MHz, excellent condition, replaced for upgrade, including 45' of 1 5/8" coax & one EIA connector, BO, A Crane, KWAZ, 2636 Hwy 95 #10, Bullhead City AZ. 602-763-5227.

TOWERS...bought and sold. Call 1-800-393-2266.

ERI FMH 12AC parts for old miter cut antenna, cheap; Myat 301-007 3" rigid transmission line, Myat & Phillips EIA flange, \$100/ea. T Wortmann, WJAG/KEXC, 309 Braasch, Norfolk NE 68701. 402-371-0780.

Copper wire for radials also copper strap/screen, BO, ASAP. E Prendergast, KAOK, 318-882-0243, FAX 318-882-6731.

Want To Buy

Rohn 45 tower, 160' with any accessories; Phelps Dodge or similar 6 bay low or medium powered CP antenna in good condition on or close to 92.3 Mhz and 3 bay low powered antenna at or near 99.5 Mhz. K Diebel, 1207 Louisa St, Rayville LA 71269. 318-728-5852.

Looking for (4) 1 5/8" connectors to go on 1 5/8" cable. K Diebel, KTJC FM, 318-728-5852 days, 318-728-3578 nights.

Used 700-980' tower; (2) used 400 - 500' towers. K Kuenzie, KFEX, 511 W 5th St, Washington MO 63090. 314-239-6800.

3 or 4 bay antenna tuned to 90.7 MHz with brackets for small tower, with or without heaters or raydome. K Austin, KFXX, 1101 Hwy 81N, Marlow OK 73055. 405-658-2556.

Coax switch (4) port 1 5/8" motorized, Bird 5 kW dummy load, RCA 11706 on-air light. L Lindstrom, WPOK, 315 N Mill, Pontiac IL. 815-844-6101.

### AUDIO PRODUCTION

Want To Sell

Sony PCM-501ES digital recording adapter (3), \$1800 ea plus freight; other assorted audio broadcast equipment, call for list. Linda, 800-521-2537.

dbx 155 4 chnl encode/decode Type I NR (2), \$200 ea/\$375 both. P Cibley, Cibley Music, POB 751 Murray Hill Sta, NNYN 10156. 212-986-2219.

### ITC

REPAIR • REFURBISHMENT • UPGRADE

Remanufactured machines available for sale or rent.

Direct from the  
only qualified ITC Cart Machine Repair Center

- All work warranted for 1 year minimum
- Service contracts available

Call Rusty

**(800) 447-0414**  
**(309) 828-1381**



International Tapetronics Corporation  
2425 South Main Street  
Bloomington, IL 61704

Op Amp Labs mic to line-level preamp, 2 chnl in custom chassis w/pwr supply, will accept one more preamp modules, \$50. C Scherer, WDOK, One Radio Ln, Cleveland OH 44114. 216-696-0123.

Fostex 4010 SMPTE reader/generator, \$325. B Seifried, Eclair Engineering, 221 Pine St, Florence MA 01060. 413-584-6767.

ADC 144 Pt TT patchbays, excellent condition, 1 rack space, 3 rows of 48, top 2 rows normalled, \$129 (you remove old wiring) or \$199, we totally refurbish with new front panel, ready to install. TT cords at cost with purchase! Also 1/4" PB's. Audio Village, POB 2902, Palm Springs CA 92262. 619-320-0728, or Fax 619-320-2454.

### Looking for Audio Bargains?

We BUY ★ SELL ★ TRADE  
QUALITY USED EQUIPMENT  
**317-962-8596**



CRL Dynafex DX-2 single ended stereo noise reduction, \$225; Belar Audio Sentry AS-1 (4), 3 years old, \$95/ea; Aphex M250 Aural Exciter III, \$415; Gentner TC100R with DTMF decoder, \$245; (5) Trimm/ADC 2 rows of 1/4" jacks, half-normalled, brought out to ADC Ultrapatch, \$165/ea. Wes, 818-798-9128.

Sparta 25 Hz tone gen & filter, \$200; (3) Sparta cart PB with rack, mono, \$900; Sparta A-20B 8 channel mono 1973 console, \$1000; (2) Sparta TTs with tonearms & mono preamps, \$300 ea. P Bridges, KGKO, 202 E Cross, Benton AR 72015. 501-778-8257.

### CASSETTES • CARTS • REELS

#### J & I AUDIO/VIDEO

A wholesaler in the Radio and Television market. Now running SPECIALS on audio and video: BASF CASSETTES-AMPEX R-Re AUDIOPAK, FIDELIPAC & ITC CARTS  
For more information call Kris Elliot at **1-800-942-1711** or write to: J&I Audio/Video 20899 Kelvin Pl. Woodland Hills, CA 91367

Circle (48) On Reader Service Card

Kurzweil Midboard, \$1199; Kurzweil 1000 Px Plus sound module, \$799; Kurzweil 1000 Hx sound module, \$699; Kawai Q-80 sequencer, \$199; all mint. M Osborne, WKSQ, POB 9494, Ellsworth ME 04605. 207-667-7573.

## HE HALL Electronics

1305-F Seminole Trail Charlottesville VA 22901

Here are just some of the bargains we have in stock:



Item	NEW	CALL
LPB-8 Pot Stereo Console		
Ramko RS-1616 routing switcher		\$ 595
BE FX-30 FM exciter		\$ 2,696
ITC Delta 3D stereo cart player	NEW	\$ 1,995
ITC Delta stereo record amplifier	NEW	\$ 495
Sennheiser HD-440 II stereo headphones	NEW	\$ 52
Eventide H-3000B harmonizer	(1 only) NEW	\$ 1,995
Harris AM-90 AM Mod Monitor	NEW	\$ 995
Marantz PMD-500 Dual Cassette	NEW	\$ 429
CRL FM2G FM Stereo Audio Processing Pkg.		\$ 1,195
Micro-Track 303 Tone Arms	NEW	\$ 99
Potomac Instruments AM-19 Antenna Monitor		\$ 495
Telos 10 10 line digital hybrid		\$ 995
Fidelipak E50-10 Cart splice finder		\$ 595
ITC DCM-1 set encoder/decoder & 2 decoders		\$ 145
Andrew 78ARF 3 1/8" EIA Connector	(-4) NEW	\$ 249

Call us for the Best New & Completely Rebuilt Equipment! (804) 974-6466

Circle (163) On Reader Service Card



Professional CD Player with Variable Pitch Control. This CD unit gives you years of clean, worry-free sound at a price that will blow your mind without blowing your budget.

List Price: \$ 572

CALL for Introductory HE Price!



## SINE SYSTEMS

RFC-1/B Dial-Up Remote Control & DAI-1 Dial-Up Audio Interface



The DAI-1 easily handles EBS requirements for "walk away" operations. It also allows direct access to the air chain in addition to providing remote broadcasts.

The RFC-1/B provides transmitter power control, has alarm dial out for 6 numbers, and provides up to 64 channels of control and metering. The best & lowest cost 'dial-up' remote control available.

Fax: (804) 974-6450



### AUDIO PRODUCTION...CONT

Eventide Ultra Harmonizer H3000, excl cond, \$2300. J Webb, KBZN Radio, 257 E 200 S #400, SLC UT 84111. 801-364-9836.

### Want To Buy

Fairchild 600 conac or 602 Conex high freq limiters. J Gangwer, 942 32nd St, Richmond CA 94804. 415-644-2363.

### AUTOMATION EQUIPMENT

### Want To Sell

SMC ESP-1 Carousel plus complete ESP-1 equipment; (2) steel equip racks on rollers, completely wired, \$1000/SMC, \$500/rack. M Taylor, KNEO, POB 845, Neosho MO 64850. 417-451-5636.

ITC R-R's (4); Schafer 903 w/many extra cards w/logging; (5) Carousels; (2) Audiofile II; SP10MK2 TTs (4); Otari ASR1000 R-R, new; Centurion 12 chnl mono audio console; Criterion cart machine; Gates stereo 80 console, all at BO. R Taylor, WHEN, 620 Old Liverpool Rd, Liverpool NY 13088. 315-457-6110.

Schafer 903 automation system w/Wyse terminal encoding system, (5) R-R decks 2.5 Audiofiles, printer, remote control, (5) racks, all service manuals, spare parts kit, \$3000/BO. B O'Connor, KDEs, Palm Springs CA. 619-325-1211.

Sentry Systems cntrlr/interface automation w/16 Pioneer PD TM3 CD plyrs, XT computer, complete AC CD library & Computer Concepts DCS, under 1 yr old, \$26K/all or priced separately. M Rollings, Rollings Comm, POB 882, Chesterfield MO 63006. 314-458-5595.

Harris 9002 (5) ITC 750/770 PBs, 48 tray mono Instacart, 3 count deck PBs, 2 VDTs, manuals & schematics, now in use. J David, KMPL/KSTG, POB 907, Sikeston MO 63801. 314-471-1520.

Sparta automation system, stereo, 2 Carousels, 2 Revox R-Rs, 2 tone sensors, clock, RS 250 random access, 1052 program controller, silence sense, \$2500. P Bridges, KGKO, 202 E Cross, Benton AR 72015. 501-778-8257.

Sono-Mag Mini-Pro w/remote head, (2) RS-350 Carousels, RSC-100 random programmer, (4) PR-99s, will sell sep or together, \$2750. S King, KGFL/FKPK, Box 33, Clinton AR 72031. 501-745-4474.

Auto Jock, good cond, \$1000/BO. M Skinner, KSGI, 341 S Bluffs St, St George UT 84771. 801-628-1000.

SMC 350 stereo Carousels (6), will sell one or all, you pay shgp, \$300/ea. J Leutz, KFSB, 2620 Dogwood Rd, Joplin MO 64801. 417-624-1310.

SMC DP 2 automation system, stereo, 2 Carousels, 3 Otari R-Rs PBs, PDC 5 clock, DS 20 switcher, computer, \$3500. P Bridges, KGKO, 202 E Cross, Benton AR 72015. 501-778-8257.

SMC MSP-1 automation system, complete with 4 Otari ARS-1000; (3) 350RSB Carousels, SMC 712 dual cart plyr, Universal interface, all in 3 matching SMC custom deluxe racks, manuals, in use, \$6000/Best Offer; Harris 9001 automation including 2 Otari ARS-1000, (2) IGM 24 Go-Carts, (2) single play ITC cart decks & 2nd system for spares or standby which incl brain, switcher, power supply, terminal, keyboard & manuals, \$4000/Best Offer. R Wynne, KFLS/KKRB, 503-882-4656.

Control Design 25 Hz tone sensor, rack mount, \$150. P Bridges, KGKO, 202 E Cross, Benton AR 72015. 501-778-8257.

Panasonic SV-3500 DAT mach (2), \$750/ea. P Fowlie, Common Mode, 50 Northfield Ave, West Orange NJ 07052. 201-736-7191.

Cetec 7000 automation system with terminal encoder & cables, (3) ITC PB reels with rack, (3) IGM 42 tray Go-Carts with racks, (2) IGM tray Go-Carts with racks, 3" disk drive for backup, printer, case of paper 12-6" rolls, all cards, cables, switches for system, all machines have been rebuilt by fact & in service, will deliver within reasonable distance. T Yarbrough, WCDD, Winchester TN. 615-967-2201.

Smartcaster 8 kHz hard drive audio computer, 4 hrs storage time, interfaces to major satellite networks or live assist, recently reconditioned, \$3000. R Miller, WTIM/WCNL, Taylorville IL 62568. 217-824-3395.

### BUSINESS OPPORTUNITIES

### Want To Sell

Recording Studio, completely set up with Gentner Digital Hybrid I telephone system, (2) R-R's, cart, CD, cassette, etc. Perfect for recording or syndication. Boston waterfront. Rent studio & 800 square foot office. \$750 or purchase studio & equipment for \$9500. 617-227-4473.

### CART MACHINES

### Want To Sell

BE 5300C tripledeck, stereo, PB, mint less than 50 hours. BO. R Kaufman, Pams Productions, POB 462247, Garland TX 75046. 214-271-7625, after 3PM CDT.

ITC R/P stereo cart machine, good condition, \$950 plus shipping; ITC 3 deck stereo PB cart machine, all tones, good condition, \$900 plus shipping. R Statham, WSTU, 1000 NW Alice Ave, Stuart FL 34994. 407-692-1000.

### ITC Upgrade Cards

- From \$199.00
  - ▼ Premium Line Play
  - ▼ Premium Line Record
  - ▼ Delta Playback
- Call for a *FREE Demo*

## AD Audio Dynamics

(804) 978-2888

BE BEFSD 100 splice finder, nice cond, \$275. L Snyder, MB Inc, Box 182, Floral Park NY 11001. 718-347-2940.

Great Prices on original equipment tape heads for ITC, BE, Fidelipac, Otari, Tascam & others!

HE Electronics  
(804) 974 6466 • FAX 6450

ITC PDII mono, R/P, good shape, \$250 + shipping. W Wawro, WFAA, 606 Young St, Dallas TX 75202. 214-977-6260.

ITC 99 R/P w/ELSA, no heads, capable of stereo use, needs interconnect cables, BO. C Scherer, WDOCK, One Radio Ln, Cleveland OH 44114. 216-696-0123.

Audi-Cord DL Series stereo R/PB, \$700/BO. R Wynne, KFLS/KKRB, 503-882-4656.

Tapecaster R/P cart mach (2), \$1500/BO. M Skinner, KSGI, 801-628-1000.

### Want To Buy

ITC stereo R/P, mono R/P. M Harris, KDOK, POB 1330, Tyler TX 75710. 903-593-2519.

ITC 3-D stereo with tones or Delta 3 stereo, stereo SP's ok, need not be in working order. L Lindstrom WPOK, 315 N Mill, Pontiac IL 615-844-6101.

ITC, BE, Fidelipac cart machines: single, triple, mono, stereo, play & record/play. Call M O'Drobinak @ 619-758-0888.

### CASSETTE & REEL-TO-REEL RECORDERS

### STUDER SERVICE SPECIALIST

Thousands Serviced • Unbeatable Rates  
Precision Capstan Resurfacing  
Audio Advantage  
Tel (615)742-3834 FAX (615)254-8826  
PRICE-QUALITY-SERVICE  
Let Us Prove It

### Want To Sell

Otari MX5050 B-2HD 2 trk (6), gd working cond, \$795 ea plus freight or \$4500/all; other equipment available, call for list. Linda, 800-521-2537.

AKAI GX6300-55 1/4", 4 trk, Quadra-Sync 10.5" reels, \$250. L Schmitz, Soundtrax, 8116 Brucar Ct, Gaithersburg MD 20877. 301-948-4288.

Technics RS-270X w/Dolby B & dbx II NR scheme, excel cond, \$225; remote control for RS-270X, \$30. L Snyder, MB Inc, Box 182, Floral Park NY 11001. 718-347-2940.

Ampex AG440 8 trk, excel cond, 10 hrs on relapped heads, \$1800; Ampex 300 Series, electronics modules only (8), \$200 ea. B Seifried, Eclair Engineering, 221 Pine St, Florence MA 01060. 413-584-6767.

### REVOX PARTS/SERVICE

Cassette-CD-Open reel  
Rebuilt B77s, \$900.00  
Capstan resurfacing, ALL BRANDS.  
**JM TECHNICAL ARTS**  
30 Music Sq. W. #156  
Nashville, TN 37203 (615) 244-6892

Panasonic SV 3700 rack mount digital audio tape decks (6) in excel cond, 9 mos old, \$900 ea or all for \$5000. W Specht, KHAS, 906 W 2nd St, Hastings NE 68901. 402-462-5101.

RCA RT-21, vgc, spares for electronics, manual, needs capstan solenoid, \$400; FT in original case, vgc, \$175. V Coleman, WXTK, 278 S Sea Ave, W Yarmouth MA 02673. 508-775-7400.

Telefunken M-12A stereo 1/4", as is, \$750; Ampex 350 & 440, 2 transports, 3 headstacks, 3 sets 440 electronics, 440 remote & roll around case, \$500. R Friedman, 1137 Recording, 1137 Fillmore St, Baltimore MD 21218. 410-889-4228.

Ampex 350 transports (3), \$35 ea or all for \$100 plus shgp. L Houck, Rollin Recdg, 210 Allgelt, San Antonio TX 78201. 210-736-5483.

Tascam 688 cassette multitrk rcdr/mixer, mint cond, \$1900/BO + shgp; Revox PR99 rcdr 7.5-15 ips w/carry case & speaker, gd cond, \$800/BO + shgp. W Wawro, WFAA, 606 Young St, Dallas TX 75202. 214-977-6260.

Marantz PMD 360 port, gd cond, \$135 + shgp; Otari 5050 full trk, remote, gd cond, \$650/BO. J Rudisill, Audio Independence, POB 640742, San Jose CA 95164-0742. 408-321-8373.

Revox A-77 R-R R/P tape machines (2), \$600 ea. P Bridges, KGKO, 202 E Cross, Benton AR 72015. 501-778-8257.

Studer B67 1/4" 2-trk 7.5, 15 & 30 ips w/stand, gd cond, \$1500. D Harris, Studio B Prod, 1018 Central Ave, Charlotte NC 28204. 704-372-9661.

**Long Life OEM Tape Heads**  
One year warranty  
Flat response of ±1dB 35 Hz to 16 kHz

**SEQUIOIA ELECTRONICS**  
4646 Houndshaven Way  
San Jose, CA 95111  
(408) 363-1646  
FAX (408) 363-0957

Revax A77 2 decks for parts or make one operate, \$75 + shgp. B Oostenburg, KCKY, POB 6, Coolidge AZ 85228-0006. 602-723-5448.

Otari ARS 1000 interfaced to operate on SMC automation system, (4), \$450/ea. J Leutz, KFSB, 2620 Dogwood Rd, Joplin MO 64801. 417-624-1310.

ITC erase, splice finder machine (2), one in gd cond, other needs work, \$800/both plus shgp. R Statham, WSTU, 1000 NW Alice Ave, Stuart FL 34994. 407-692-1000.

Conex CG 25A 25 Hz tone gen, adjust tone levels, timing intervals. Paul, 612-222-5555.

Uher 4200 Report Monitor, R-R stereo 1/2 trk portable, 3 hds, 4 speeds, new in box, \$500. R Sumner, CAVU Corp, 3322 Applegate Ct, Annandale VA 22003. 703-968-8894.

**CLEAN PATCH BAYS NO DOWN TIME**

**VERTIGO BURNISHERS AND INJECTORS RESTORE ORIGINAL PERFORMANCE TO YOUR PATCH BAYS**  
\$34.95 Ea.  
**VERTIGO RECORDING SERVICES**  
12115 Magnolia Blvd. #116 818-907-5161  
North Hollywood, CA 91607 fax 818-784-3763

Otari Mark II-IV 1/2" 4-track, multi-track, mint, less than 50 hours, Best Offer. R Kaufman, Pams Productions, POB 462247, Garland TX 75046. 214-271-7625, after 3PM CDT.

16 trk 2", \$3450; Otari 1" 8 trk, \$2450; 5050 III-8, \$1950; Ampex ATP800 mono, \$750; Tascam 25-2, \$750; Tascam 52 mint, \$1200; MCI Locator III, \$1195; Ampex AG350 solid st electr, \$100/ch. W Gunn, 619-320-0728.

Tascam 112R cassette decks, 3 head, auto reverse, source/tape monitoring, pitch control, \$395. Pro Digital Inc., 215-328-6992.

Ampex, ITC, Scully Reel-to-Reel Tape Recorder Spare Parts, Accessories Motor Remanufacturing.

**VIF INTERNATIONAL**  
PO Box 1555  
Mtn View CA  
94042 U.S.A.

Inside USA: 1-800-848-4428  
Outside USA: 1-408-739-9740  
FAX: 1-408-739-0809

Scully '100' recorders, record/play amplifiers, 8, 16, 24 track heads. Sequoia Electronics, 4646 Houndshaven Way, San Jose CA 95111. 408-363-1646.

Recorder hds, used Scully mono & 2 trk, \$25-50, ATR100's, 3M M79-16 & 8's, Otari 1/2" 8 trks, \$495. W Gunn, 619-320-0728.

## EMPLOYMENT

To place ads in this section, use the ActionGram form. To respond to box numbers write Radio World, PO Box 1214, Falls Church, VA 22041. Attn:\_\_\_\_\_

### POSITIONS WANTED

Pleasant voice, friendly personality, career oriented female seeks relocation to AZ, CA, or NV areas, gifted writer, full of excitement. Barbara Ann, 405-872-9384.

Experienced pro seeks Midwest market, for FT shift, currently employed in Michigan doing Country, good production. Jack, 906-643-8569 or 414-242-4357.

Experience isn't only years! Hire Janet, 502-895-5888. PT announcing, programming aspirations, computer literate, in radio since 1980 w/mktg exper, serious inquiries only.

Hands on Engineer w/over 30 yrs of AM/FM/TV. MF/HF/UHF background, desires position with Int'l SW bdctg facility, FCC Gen SBE Cert, IEEE, AE Degree. Lou, 904-383-8457.

Country/AC, currently AM drive/MD, humorous, topical & great phone voice. Mike, 707-253-8548.

Freelance writer available for radio/TV infomercials, rare combination of direct mktg & bdctg skills, 24 hour FAX. Call Doug, 510-531-2404.

5 yrs exp in sportscasting would like to relocate back to SE, do news, sports, prod & operate board. Michael, 602-364-2279 evenings or 602-364-3484 days.

### HELP WANTED

WNOK-FM/WOIC-AM Radio is accepting applications for a Chief Engineer. This position requires a strong background in broadcast engineering with emphasis on maintenance. Individual will work with other department heads to provide complete technical services to both radio stations. The successful candidate should have experience with AM and FM transmitters, audio systems, remote production, computer hardware, and technical budgeting. The WNOK/WOIC Chief Engineer will be responsible for compliance with FCC rules and regulations. SBE certification is desired but not required. Please mail resume to Margaret Fort, WNOK/WOIC Radio, PO Drawer 50568, Columbia, SC 29250 or Carl Davis, Voyager Communications, 3201 Glenwood Avenue, Suite 301, Raleigh, NC 27612. EOE.

Position Open for Chief Engineer. WTIC AM & FM, Connecticut's most powerful radio stations, are looking for a Chief Engineer. Duties include studio & transmitter maintenance, remote implementation, budget maintenance, & various mgmt duties. Emergency on-call status required. Candidates should have a minimum five (5) yrs exper w/AM & FM transmitters, preferably high power, strong studio equipment maintenance & troubleshooting skills, be computer literate, be imaginative in regards to remotes, & be a team player. Candidates should also have either a valid FCC General Class license &/or SBE Certification. Strong mgmt skills a plus. To be considered for this position at one of America's most respected broadcast facilities, send resume w/cover letter to: Gary Zenobi, General Manager, WTIC and WTIC-FM, One Financial Plaza, Hartford CT 06103. WTIC AM & FM, The Ten Eighty Corp is an equal opportunity employer.

**Ass't Engineer**  
KVOO in Tulsa OK needs a FT ass't engineer. Exper in AM directional & FM w/subcarriers helpful. Detailed studio maint exper a must & knowledge of digital/computers. Old stable firm w/great benefits. Part of Midwest chain. EOE. Send resume to: Larry White, KVOO, POB 52548, Tulsa OK 74152. No calls please!

### HELP WANTED

Arizona only, chief engineer, experienced all phases of high power AM & FM, 20 years experience including Top 50/100 markets, dry warm climate, chief, group chief or contract. Send replies to: Radio World, POB 1214, Falls Church VA 22041. Attn: Box 94-01-26-01 RW.

### AUDIO CONSOLE TEST ENGINEER

Manufacturer of high quality audio mixing consoles for the television and radio broadcast markets currently seeks to fill a position in our console testing/quality assurance department.

The ideal test engineer will be at least an ASE with a solid analog and TTL electronics background. This is a hands on testing/troubleshooting position in a fast paced manufacturing environment. Pro Audio, PC and Audio Precision experience are all big pluses. Send resume and three professional references to:

**Test Engineer**  
PO Box 70  
Mattydale, NY 13212

**CHIEF ENGINEER**  
Experienced AM-FM chief needed to take over #1 combo. Studio, computer, DA, RF, satellite, budgets, team player. Call: **Tad Alexander, WDOCK-WRMR** 1 Radio Ln., Cleveland, OH 44114 **216-696-0123** EOE, M/F

**TOO MANY OPENINGS!**  
We have too many openings & not enough people to fill them. If you're serious about your career, we're just as serious about taking you to the next level! Hundreds of openings for air talent, news, mgmt, prod & sales, also many engineering positions available in all aspects of broadcasting...all you do is subscribe. **No % of your pay, no contracts!** Besides our pub., we also have our BBS & Rapid Line (jobs by phone) up & running. Ask about our FREE renewals & resume bank. You'll be surprised at how inexpensive we are, check us out!

**BROADCAST EMPLOYMENT WEEKLY**  
**1-800-922-JOBS**  
1125 W. Boone Ave., Nampa, ID 83651  
**BBS 1-208-467-4110**

**ABOUT OUR EMPLOYMENT SECTION**

**HELP WANTED:** Any company or station can run "Help Wanted" ads for \$1.50/word or buy a display box for \$60/column inch. Payment must accompany insert, use your MasterCard or VISA; there will be no invoicing. Blind box numbers will be provided at an extra charge of \$10. Responses will be forwarded to listee, unopened, upon receipt. Call 800-336-3045 for details.

**POSITIONS WANTED:** Any individual can run a "Position Wanted" ad, FREE of charge (25 words max), and it will appear in the following 2 issues of Radio World. Contact information will be provided, but if a blind box number is required, there is a \$10 fee which must be paid with the listing (there will be no invoicing). Responses will be forwarded to the listee, unopened.

**Mail to: BROADCAST EQUIPMENT EXCHANGE**  
**PO Box 1214, Falls Church, VA 22041**  
**Attn: Simone Mullins**



CASSETTE/R-R...con't

Want To Buy

Otari MX 5050 III, 1/4", 2 brk, late mdl, must be in excel working cond. Susan Kernes, True North Prod, POB 984, Homer AK 99603. 907-235-5194 or FAX: 907-235-3414.

Cooper ARPC resolver & time code interface for Nagra; Nagra QSEF balanced input preamp. G Warren, 3715 N Lakewood, Chicago IL 60613. 312-327-4785.

Sony TC-105, need motor. D Meish, Mobile Radio Comm, Box 100, Chester SD 57016. 605-489-2497.

Spotmaster TP-60B tape timers from cart tape winders (TP-1A or TP-1B). Mel Crosby, 408-363-1646.

Magnecord Model 1024. Stead Recording Service, 1321 S.W. 28th Ave., Boynton Beach FL 33426. W Stead, 407-734-8076.

Ampex ATR100 taperecorders for parts. Circuit cards, heads, motors, machine parts, or electronic parts. Call 818-907-5161.

CD PLAYERS

Want To Sell

Sony PCM-1630 CD mastering system in excellent condition, system incl PCM 1630, DABK 1630/31, DMR 4000, DTA 2000, 9" monitor, printer, comp manuals, (2) rd cases, call for price. N Sarikanda, Masterworks Rec, 1020 N Delaware Ave, Philadelphia PA 19125. 215-423-1022.

Denon DN-970FA CD card player, new in box. Originally \$1850, sell \$1295. Pro Digital Inc., 215-328-6992.

COMPUTERS

Want To Sell

Heathkit H89 has floppy drives, \$50. T Wortmann, WJAG/KEXC, 309 Braasch, Norfolk NE 68701. 402-371-0780.

Tandy 6000HD w/at least 1 floppy drive. Mel Crosby, 408-363-1646, FAX 408-363-0957.

CONSOLES

Want To Sell

Shure M-67 original condition, \$150. V Coleman, WXTK, 278 S Sea Ave, W Yarmouth MA 02673. 508-775-7400.

Audiotronics 110A 2 channel/4 channel, 2 stereo inputs, 4 mono inputs with EQ, foldback, 2 echo returns, 144 pt TRS patchbay, 4 VU meters, \$2500/Best Offer. L Schmitz, Soundtrax, 8116 Brucar Ct, Gaithersburg MD 20877. 301-948-4288.

Ward Beck broadcast console, 26 in, 9 out, fully parametric EQ, dynamics modules, 4 subs, 4 aux, P&G faders, \$4500. R Friedman, 1137 Recording, 1137 Fillmore St, Baltimore MD 21218. 410-889-4228.

RCA BT15AD dual mono channels, 2 VU meters solid state, nice condition with manual, \$250. R Elm, WWJC, 1120 E McCuen, Duluth MN 55808. 218-626-2738.

Soundworkshop 1208-EX, 12 input, parametric EQ, separate monitor system, mint condition, \$1500. C Volpe, Volpe Recording, 5210 Silver Spring Rd, Perry Hall MD 21128. 410-931-1163.

Roland CompuEditor, automated fader package, SMPTE based with 15 long throw ALPS faders, 15 channels of voltage controlled gain elements (2), \$500. B Seifried, Clair Engineering, 221 Pine St, Florence MA 01060. 413-584-6767.

McCurdy SS8808A broadcast console, 10 channels, 2 channels have multi-input selectors, 3 spare pwr splys, BO. P Fowle, Common Mode, 50 Northfield Ave, West Orange NJ 07052. 201-736-7191.

Soundtracs MR Series 24x8x2 recording console with 6 monitor returns, excellent condition, \$4000/Best Offer + shipping. W Wawro, WFAA, 606 Young St, Dallas TX 75202. 214-977-6260.

Arrakis 500 stereo 1986 console, \$2000. P Bridges, KGKO, 202 E Cross, Benton AR 72015. 501-778-8257.

Gates Executive 10-chnl stereo board w/manuals, some modules missing, taken out of service 1/93, \$500. R Miller, WCNL/WTIM, Taylorville IL 62568. 217-824-3395.

Collins/Autogram IC10, good condition, \$2500. Mike Starr, WKLS-FM/Atlanta, 404-325-0960.

DISCO-PRO SOUND EQUIP

Want To Sell

Cerwin-Vega DM-1 mixer, \$125/BO; JVC BP-5 biphonic processor, converts binaural to stereo, \$125/BO. J Rudisill, Audio Independence, POB 640742, San Jose CA 95164-0742. 408-321-8373.

JBL ceiling speakers (2), \$35/each, used in suspended ceilings, includes housing, speaker & control knob. B Lord, Lord Broadcasting, 13313 SE 208th St, Kent WA 98042. 206-631-2374.

Rane AC23 crossover, \$250; JBL 2445 horns 12" mid mounted in cabinets, excellent condition, \$1400; JBL crossover, \$90. D Kocher, Digital Sound Makers, 1901 Hanover Ave, Allentown PA 18103. 215-776-1455.

FINANCIAL SERVICES

**EQUIPMENT FINANCING**

ON ALL RADIO EQUIPMENT

- Easy to qualify
- Fixed-rate, long-term leases
- Any new or used equipment
- 100% financing, no down payment
- No financials required under \$50,000
- Refinancing existing equipment

EXCHANGE NATIONAL FUNDING

**Call Mark Wilson (800) 275-0185**

LIMITERS

Want To Sell

Gates/Harris M6629 Solid Statesman AGC, \$75. R Elm, WWJC, 1120 E McCuen, Duluth MN 55808. 218-626-2738.

Orban 424A w/chnl gated compressor/limiter, de-esser, \$500. L Schmitz, Soundtrax, 8116 Brucar Ct, Gaithersburg MD 20877. 301-948-4288.

UREI 1176 gd cond, \$475. V Coleman, WXTK, 278 S Sea Ave, W Yarmouth MA 02673. 508-775-7400.

CRL FM-3G SGC-800/SEC-800, like new, \$2500. G Leonard, KWWR, POB 475, Mexico MO 65265. 314-581-5500.

Valley People 440 limiter, compressor & sibilance processor, excl cond, little use, \$300. P Russell, Baudoin College, Sils Hall, Brunswick ME 04011. 207-725-3066.

Orban Optimod 8100 A1 with exar Card 5 & original card 5 incl, excellent condition, (2) Texar audio Prism, excellent condition, MSI CP-803 composite clipper, all equipment complete with manuals & will be sold as complete processing system for 1 price, \$6000/all. Tommy, KNFM-FM, 2911 La Force Blvd, Midland TX 79711. 512-563-5636.

CRL APP 400 audio prep processor, PMC 300A peak mod controller, SPF pre emphasis filter, \$1000. P Bridges, KGKO, 202 E Cross, Benton AR 72015. 501-778-8257.

Want To Buy

Orban 8100A1 with XT2 chassis, MSI CP-803 composite clipper, Valley 400 mic processor, Orban 412A or equivalent stereo comp/limiter. L Lindstrom, WPOK, 315 N Mill, Pontiac IL. 815-844-6101.

Fairchild 670 or 660 tube compressor/limiter, Teletronics LA-2A tube compressor/limiter or UREI LA-3A solid state compressor/limiter, call after 3PM CST. 214-271-7625.

MICROPHONES

Want To Sell

Shure EQs (3), \$75 each; Shure remote sports package, mixer, 2 headsets & HP amplifier, \$350. P Bridges, KGKO, 202 E Cross, Benton AR 72015. 501-778-8257.

RCA 77DX good condition with yoke, \$650; RCA 74B in clean good condition, \$350. AC Elliott, Quitman Broadcasting, POB 33, Quitman MS 39355. 601-776-6197.

AKG 414's, \$695, original D12 like the Beatles used, \$295, Sony ECM54, \$150, Beyer M500 lk new, \$300, Demeter 4-ch tube DI rack mt lk new, \$875. W Gunn, 619-320-0728.

Gefell Neumann UM57 tube mics, New capsules for SM2 & many others, New AC701 tubes for Neumann mics, \$275. W Gunn, 619-320-0728.

Want To Buy

RCA 91-A mic desk for RCA 44 mic. E Kovach, 1409 Oak St, Wyandotte MI 48192. 313-285-9710.

EV 666 w/connector, desk stand & stand clamp in excel electrical & physical condition. D Sites, VOA Sri Lanka, Colombodo, Washington DC 20521. 202-619-1897.

Shure SM-5B reasonable, EV RE-20 w/shockmount. L Lindstrom, WPOK, 315 N Mill, Pontiac IL. 815-844-6101.

Hewlett-Packard 15109, 15108, 15119 & 15118 lab reference mics, any cond. S Dansey, WCWM, Williamsburg VA 23185. 804-229-1547.

RCA 77DXs/44BXs ribbon, chrome/TV grey, good condition, BO. R Kaufman, Pams Productions, POB 462247, Garland TX 75046. 214-271-7625, after 3PM CDT.

77-DX's, 44-BX's, KU-3A's On-Air lights. Top price paid. Fast response. Bill Bryant Mgmt, 2601 Hillsboro Rd, G12, Nashville TN 37212. 615-269-6131.

MISCELLANEOUS

Want To Sell

Old equip manuals, RCA, GR, Presto, others, send SASE for list & prices. V Coleman, WXTK, 278 S Sea Ave, W Yarmouth MA 02673.

**AUDIO TRANSFORMERS**

- LOW DISTORTION + 2% THD @ 30 Hz
- BROAD FREQUENCY RESPONSE ±1 dB, 20-20 kHz
- MAGNETIC SHIELDING 10-30 dB
- VARIOUS MECHANICAL CONFIGURATIONS
- 60 TYPES STOCKED FOR DELIVERY

MODEL	IMPEDANCE (ohm)	SEC.	MAX. PWR (dBm)	1% PRICE	DISCOUNT ON PREPAID ORDERS PLUS FREE SECOND DAY AIR
MR-72	15000	15000	+16	37.25	
MR-80	15000	15000	-30	46.75	
MR-84	15K	15000	+4	29.60	
MR-87	15000	600	10	29.60	

**FREE CATALOG OF AUDIO ACCESSORIES**

USA & CANADA ORDERS (800) 634-3457  
 FAX ORDERS (800) 551-2749  
**SESCOM, INC.**  
 2100 WARD DR  
 HENDERSON, NV 89015 USA  
 TECH LINE: (702) 565-3993 M-Th 8 am to 4 pm (PST)  
 3 line req. answered by our technicians. Free catalog by return mail.

Circle (140) On Reader Service Card

Topaz 93550 AC line regulator 50 KVA 3 phase 208Y/120, \$400; Topaz 93445-21 isolation transformer 45 KVA 3 phase 208Y/120, \$400. T Wortmann, WJAG/KEXC, 309 Braasch, Norfolk NE 68701. 402-371-0780.

Lil Miss Moffat 48 volt Phantom power supply, (2), \$20/each; (2) new 6' rack rails, \$20/each; other size pieces available, free with purchase, all items + shipping. B Lord, Lord Broadcasting, 13313 SE 208th St, Kent WA 98042. 206-631-2374.

Rotron Blowers for Elcom, Harris, CCA, CSI, McMartin, rebuilt & new. Goodrich Enterprises Inc. 11435 Manderson St, Omaha, NE 68164. 402 493 1886 FAX 402 493 6821

Northern Technologies TCS-LAPE surge suppressor, 240 V, 3 phase Delta config, 3 yrs old, great cond, \$700 + shpg; Magnatek 223-3212 Jefferson Electric dry transformers (2) input 240 V Delta, out 208 V WYE, \$700/ea + shpg. D Morgan, KJYE-KNZZ, 1360 E Sherwood Dr, Grand Jct CO 81501. 303-241-9230.

Want To Buy

Metal Bell System ringer boxes & round or oval base. J Newman, Box 1211, Newport RI 02840. 401-847-0455.

Radio Dramas, narrations, story's wanted for production; also looking for weird, space, alien sfx sounds. R Suraci, Fine Art Prod, 67 Maple St, Newburgh NY 12550. 914-561-5866.

Cutting lathes, Neumann, Westrex, Gramplan, tube amps, 16" tables/arms, 45/78 records. K Gutzke, Custom Recording, 7134 15th Ave S, Minneapolis MN 55423. 612-866-6183.

Jazz record collections, 10" LP/12" LP be-bop, swing, dixie, highest prices paid. B Rose, Program Recdgs, 228 East 10th, NINY 10003. 212-674-3060.

Ampex tube recorders and mixers. W Gunn, 619-320-0728.

Radio transformers by Chicago, UTC, Triad, Peerless, Freed, Sola, send list. J Gangwer, 942 32nd St, Richmond CA 94804. 415-644-2363.

MONITORS

Want To Sell

Modulation Sciences 188 data SCA generator, \$3600. R Humphrey, WVVVA, 1015 Main St, Wheeling WV 26003. 304-232-1170.

Gorman Redlich EBS encoder/decoder, like new with manual, \$250 plus shipping. B Dickerson, WEAG, 1421 S Water St, Starke FL. 904-964-5001.

TFT EBS rcvr, decoder & encoder, does not work, problem unknown, \$100 + shpg. K Austin, KFXI, 1101 Hwy 81N, Marlow OK 73055. 405-658-2556.

Belar FM RF amp currently tuned to 107.1, \$400/BO. R Wynne, KFLS/KKRB, 503-882-4656.

Want To Buy

C-QUAM modulation monitor, must be in gd cond. M Mauney, KCON, POB 1406, Conway AR 72033. 501-327-6032.

McMartin (buy & sell) any model. C Goodrich, 11435 Manderson, Omaha NE 68164. 402-493-1886 or fax 402-493-6821.

RECEIVERS & TRANSCEIVERS

Want To Sell

Panasonic portable FM-SW-MW-31 band receiver model RF-3100 dbi super-heterodyne, digital freq readout, recording jack, AC-battery operation, good shape, works perfect, \$250/Best Offer. L Snyder, MB Inc, Box 182, Floral Park NY 11001. 718-347-2940.

SCA RECEIVERS—ALL TYPES

Reading Service / Ethnic / Data Professional / Table Will work to meet your receiver needs

DAYTON INDUSTRIAL CORP. (Manufacturer) 2237 Industrial Boulevard Sarasota, FL 34234 Tel: 813 351 44545 FAX: 6081

Regency 20 W mobile units (3), 161.7 MHz, \$100 each. P Bridges, KGKO, 202 E Cross, Benton AR 72015. 501-778-8257.

**AM STEREO RECEIVERS**  
 From \$34.95 Portable, Home, Auto  
**RRADCO**  
 Phone/FAX 708-513-1386

Yaesu FTS-6 tone encode decode for FT 1123, 1143, 209, 727, 109, 409 radios, (2), \$20/ea; Motorola Spirit VHF tone & voice pagers w/chgr & tone rcvrs, (3), \$20/ea. P Russell, Baudoin College, Sils Hall, Brunswick ME 04011. 207-725-3066.

DISTRIBUTOR DIRECTORY

The following distributors serving the broadcast industry would be glad to help you with any of your requirements.

... Canada, the Caribbean, Shannon to Shanghai, the dynamite Fifty ...  
**RADIO! The beat goes on!**  
**CROUSE-KIMZEY OF ANNAPOLIS**  
 tops in broadcast equipment  
**1-800-955-6800**  
 ask for Kathleen

---

**CORNELL-DUBILIER MICA CAPACITORS**  
**FROM STOCK**  
**JENNINGS VACUUM CAPACITORS**  
**FROM STOCK**  
**JENNINGS VACUUM RELAYS**  
**SURCOM ASSOCIATES**  
 2215 Faraday Ave., Suite A  
 Carlsbad, California 92008  
 (619) 438-4420

**PHONE: 703-998-7600 FAX: 703-998-2966**

Call Simone Mullins, Classified Ad Manager, to reserve space in the next issue. Use your credit card to pay, we now accept VISA and MASTERCARD.

**Radio World**  
 5827 Columbia Pike, 3rd Floor  
 Falls Church, VA 22041

Select from these categories for best ad positioning:

- Acoustics
- Amplifiers
- Antennas & Towers & Cables
- Audio Production (Other)
- Brokers
- Business Opportunities
- Cart Machines
- Cassette & R-R Recorders
- CD Players
- Computers

- Consoles
- Disco-Pro Sound Equip.
- Financial Services
- Leasing
- Limiters
- Microphones
- Miscellaneous
- Monitors
- Receivers & Transceivers
- Remote & Microwave Equip.
- Satellite Equipment

- Software
- Stations
- Stereo Generators
- Tapes, Carts & Reels
- Tax Deductable Equipment
- Test Equipment
- Transmitter/Exciters
- Tubes
- Turntables
- Positions Wanted
- Help Wanted

**Classified Advertising Rates Effective January 1, 1994**

	1x	3x	6x	12x
1-9 col inch (per inch)	\$60	58	54	49
10-19 col inch (per inch)	55	52	49	44
Distributor Directory	100	95	90	85
Professional Card	65	60	55	50
Classified Line Ad	\$1.50 per word			
Blind Box Ad	\$10 additional			

To compute ad costs: Multiply the number of ad inches (columns x inches) by the desired rate schedule for your per unit cost. Example: a 3" ad at the 1x rate is \$180, at the 3x rate \$174, at the 6x rate \$162, at the 12x rate \$147, etc.



**RECEIVERS/TRANSCIVERS...WTS**

Professional SCA demod card with excellent crosstalk rejection, \$20; Superadio III with SCA, \$85, performance guaranteed. 1-800-944-0630.

Maxon Drop-In charger for CP/CS-510 UHF, CP/CS-510 VHF & SP-5000 series charger CA-1110A, chargers CA-1450 NiCads, holds radio & 1 battery, brand new in box, \$100. MRG Prod Assoc., 516-447-1041.

GCR-201  
25, 40 &  
80 Amps,  
17,000 Volts

**Features:**

1. Lowest priced RF connector in the world.
2. Large microswitches; powerful solenoids.
3. 50% less moving parts than competition.

GELECO:

Ph: (416) 421-5631  
Fax: (416) 421-3880

**REMOTE & MICROWAVE EQUIPMENT****Want To Sell**

TFT 7610-C/7610-R digital telemetry control, \$700/BO or will trade for mod monitor. B Barrett, KZPI, 916 NM 418 Lot 2, Deming NM 88030. 800-776-2040.

**COMREX RENTALS**

**1, 2 and 3-Line Extenders Switched 56 Systems**  
Call Steve Kirsch for details  
**Silver Lake Audio**  
(516) 623-6114 FAX: 377-4423

Mobile unit in shape of Radio, great for remotes, promos, shows, excel attention getter, BO. E Stoulig, Sound Traxx Prod, 224 S 2nd St, Ponchatoula LA 70454. 504-386-3449.

Mark 8' STL grid type, \$1200/BO. M Grubbs, POB 1047, Luling TX 78648. 210-875-2555.

**SERVICES****Get Legal!**

How are we going to comply with the new emission rules for AM stations without a splatter monitor or spectrum analyzer?

For \$500, you can comply with the new \$73.44 spec. Call Tony Dinkel at Microwave Frequency Services.

Services available in Southern/Central CA, AZ and NV. Service area will expand if demand dictates.

**1-800-2-GET-LEGAL**  
or fax at 310-425-6299 both #'s 24 hrs.

Harris Sentinel 16 remote cntrl w/manu- als, just taken out of service, \$500. R Miller, WCNL/WTIM, Taylorville IL 62568. 217-824-3395.

Marti STL 8 950 MHz xmt & rcvr w/2-4' parabolic antennas, 250' jacketed coax w/4 connectors, \$2715; Marti M30 BT RPU xmt & rcvr, mic & antennas, 161.7 MHz, \$1750. P Bridges, KGKO, 202 E Cross, Benton AR 72015. 501-778-8257.

**RENTALS RENTALS RENTALS****COMREX**  
3-line extender

Frank Grundstein 215-642-0978  
Audio/Video Consultants

TFT 7610 remote cntrl has 20 chnl monitoring w/7615 status monitoring/direct cntrl units, some spare parts, \$800. E Gehringer, WKEE Radio, 134 4th Ave, Huntington WV 25701. 304-525-7788.

Marti STL-10 2 TX, 2 RX, stereo with manuals, excellent condition, \$4200. J Salov, WHGR, POB 546, Jackson MI 49204. 800-968-4636.

Gentner SPH-3A telephone interface system, excellent condition with manual, \$325. R Sumner, CAVU Corp., 3322 Applegate Ct, Annandale VA 22003. 703-968-8894.

**Want To Buy**

Old Marti remote broadcast transmitter for parts, will consider transmitter & receiver; also need copy of receiver svc manual. G Phillips, WLNC, POB 925, Laurinburg NC 28353. 910-276-0000.

Mark 4' STL dish, M Grubbs, POB 1047, Luling TX 78648. 210-875-2555.

Moseley 505 receiver & transmitter, pre- fer on 964.00 MHz. C Cooper, WHLC, Hwy 64 E Highlands-Cashiers Rd, Highlands NC 28741. 704-526-1045.

UHF Marti RPT-30 or 25 transmitter & receiver, 2 channel preferred but 1 channel ok. L Lindstrom, WPOK, 315 N Mill, Pontiac IL. 815-844-6101.

**SATELLITE EQUIPMENT****Want To Sell**

Equitorial 5100 cntrl/rcvr. \$60. T Wortmann, WJAG/KECX, 309 Braasch, Norfolk NE 68701. 402-371-0780.

Fairchild Dart 7.5 & 15 KHz audio cards for Dart 384 rcvr. Paul, 612-222-5555.

Fairchild Dart 384 rcvr 7.5 & 15 kHz audio cards. P Bailon, 1218 Pioneer Bldg, 336 N, St Paul MN 55101. 612-222-5555.

**At Last! A New Dats/Sedat Digital****Shipping Now!**

The *Ariel*  
**LNB System Dart 384 Compatible New 7.5/15 KHz Dats Card**

**24 Hour Phone / Fax Technical Support All Networks & Receivers Satellite Systems (719) 634-6319 (Fax) 635-8151**

Drake sat receiver, tuneable audio great for networks such as USA, PRN, Salem, etc, used with 30 day warranty, \$65. D Littleton, WAZF, POB 47, Yazoo City MS 39194. 601-746-2372.

AP satellite receiving dish, equatorial 24" dish & mount, rear mounted Harris down- converter & LNB, use with Spacenet, GStar, Galaxy no receiver, used, working, BO. MRG Prod, 516-447-1041.

**OuterSpace Experts!**

**We SELL ★ TRADE ★ BUY SATELLITE EQUIPMENT 317-962-8596**



Adcom/SA 7550 sat rcvr on Unistar AC II format ready to go, took out 12/93, stereo w/block down converter, all manuals, \$3500. J Leutz, KFSB, 2620 Dogwood Rd, Japlin MO 64801. 417-624-1310.

**Want To Buy**

Fairchild Dart 384 15K card, 7.5K card & 3K cue card, new now, very urgent. D Allan, KTYD, 5360 Hollister, Santa Barbara CA 93111. 805-967-4511.

Wegener system for Unistar, need spare cards. L Lindstrom, WPOK, 315 N Mill, Pontiac IL. 815-844-6101.

**SOFTWARE/DATABASES****Want To Sell**

**U.S. RADIO STATION DATABASE:** stand-alone program containing 11,500+ stations. Many searches, prints mailing labels. MAC/IBM (specify disk size). Visa/MC \$99.95/yr. (+quarterly updates):  
**1-800-626-2360 ext. 300 BBH Software, Inc.**

**PC SOFTWARE** for Broadcasters. Traffic, Billing, & Accounting. Powerful, inexpensive. Works with automated, satellite or live operations. INTERFACES with popular DIGITAL AUTOMATION SYSTEMS. Try it for 90 days, no obligation.  
**Absolute Broadcast Automation**  
Naples, Florida (813) 643-3689

**STATIONS****Want To Sell**

Class A FM construction permit, Northern California. R Trumbo, KNLF, POB 117, Quincy CA 95971. 1-800-397-4146.

WKFL, Bushnell FL 1 kW AM daytime w/valuable real estate, now off air, \$35K. H Reams, WKFL, POB 1000, Bushnell FL 33513. 813-896-7171.

Person to lease/purchase FM station for small beach town in West coast of FL, mthly payments as low as \$4000. Bill, 806-359-4000.

AM & FM western Colorado, AM was country format, both dark now, \$75,000 both, \$50,000 Fm, \$35,000 AM; Transaction Realty Professionals, Inc. (303) 945-2361.

5000 W AM directional, good market area in Colorado, great opportunity. Write to: 412 Nile, Aurora CO 80010 or call 303-344-0838.

**Want To Buy**

Unbuilt CP's and dark stations. M Ebron, 4723 Country Club Rd, Morehead City NC 28557. 919-240-1600.

Station in NY, PA, KY, IL, MI, OH or IN, qualified buyer-operator. Send info to: Box 297, Corinth NY 12822.

**TAPES/CARTS/REELS & CD's**

**A&D Cart Rebuilding**  
Do Bad Carts Have Your Temperature Rising?  
Let A&D clean, load & pack your carts. They'll be serviced within 10 working days! Guaranteed!  
3706 Vold Ct. 715-835-7347  
Eau Claire WI 54701 Fax: 715-835-1151

**Want To Sell**

Ampex 407 mastering tape, 10.5" reels, 1/4" x 3600', new in box, \$10/reel, \$90/box of 10; 3M/Scotch #20 1/2" x 1000', 2.5 mil uncoated white paper on 7" reel, \$4/reel, \$3/reel/quantity. R Sumner, CAVU Corp, 3322 Applegate Ct, Annandale VA 22003. 703-968-8894.

Ampex 10 1/2" metal reels, hubs, boxes, \$1.50/each + shipping. J Rudisill, Audio Independence, POB 640742, San Jose CA 95164-0742. 408-321-8373.

Broadcast cartridges in various lengths, good condition, over 1000 available, \$1.69 each plus shipping. R Lewis, Cross the Road Productions, POB 801763, Santa Clarita CA 91502. 818-954-0214.

Adult Contemporary CD library, approx 300 titles on 65 CDs, 1980 to present, \$1600. Karen or Bob, WBNK, 485 Tower Rd, Christiansburg VA 24073. 703-382-6106.

Pams Jingles ref tapes, 1951-1976, BO. R Kaufman, Pams Productions, POB 462247, Garland TX 75046. 214-271-7625.

**CONSULTANTS****PC - SOFTWARE**

AM FM TV Search Programs  
Contour Mapping-STL Paths  
RF HAZ-1990 POP Count  
FAA Tower-Draw Tower

Doug Vernier  
Broadcast Consultant  
1600 Picturesque Dr  
Cedar Falls, IA 50613

**800-743-DOUG****EVANS ASSOCIATES**

Consulting Communications Engineers

TV • FM • AM • ITFS • Satellite  
FCC Applications, Design  
and Field Engineering

Video/Data/Voice • Light Fiber &  
Microwave • Wide-Area Networks & STL's

216 N. Green Bay Road  
Thiensville, WI 53092  
(414) 242-6000 • FAX (414) 242-6045  
Member AFCCE

**W. LEE SIMMONS & ASSOC., INC.**

**BROADCAST TELECOMMUNICATIONS CONSULTANTS**

5 Gracefield Road  
Hilton Head Is., SC 29928

**1-800-277-5417  
803-785-4445  
FAX: 803-842-3371**

North America RF & Audio

**Mirkwood Engineering Services**

**Broadcast and Telecommunications Consultants**

Multidiscipline Engineering and Planning Firm  
including • Application & Allocation Services

- Project, Engineering & Construction Management • Site Acquisition
  - Rural & Remote Site Installations
  - Field Service • Studio Design & Installation
- 50 Park Ave. Claremont, NH 03743  
(603) 542-6784

**MLJ**

Moffet, Larson & Johnson, Inc.  
Consulting Telecommunications Engineers

Two Skyline Place, Suite 800  
5203 Leesburg Pike  
Falls Church VA 22041

(703) 824-5660  
FAX: 703-824-5672

Member AFCCE

**Space Available!**

For details, contact Simone at  
**1-800-336-3045**

**MULLANEY ENGINEERING, INC.**

Consulting Engineers

- Design & Optimization of AM Directional Arrays
- Analysis for New Allocation, Site Relocation, and Upgrades
- AM-FM TV LPTV Wireless Cable (MDS/MMDS/ITFS/OFS)
- Environmental Radiation Analysis
- Field Work
- Expert Testimony

9049 Shady Grove Court  
Gaithersburg, MD 20877  
Phone: (301) 921-0115  
Fax: (301) 590-9757

**Consulting Communications Engineers**

- FCC Data Bases
- FCC Applications and Field Engineering
- Frequency Searches and Coordination
- AM-FM-CATV-ITFS-LPTV

**OWL ENGINEERING, INC.**

1306 W. County Road. F.  
St. Paul, MN 55112  
(612)631-1338 "Member AFCCE"

**REMOTE EQUIPMENT RENTALS**

**COMREX and GENTNER**  
1, 2 & 3-Line Extender Systems  
Now With The New GENTNER EFT-3100  
MARTI VHF/UHF RPU Systems  
Switched-56 Systems  
Call or FAX Dwight Weller  
**WELLER AUDIO-VISUAL ENGINEERING**  
Baltimore, MD  
Phone: (410) or (800) 252-8351  
FAX: (410) 252-4261

**LOCATION SERVICES IN THE UNITED KINGDOM**

Planning remotes from the U.K.? we provide a comprehensive service  
• we organize venues for your shows  
• we provide temporary equipment  
• live links via ISDN/Switched 56  
• experienced radio engineers  
• we help you line-up guests  
Contact New York (212) 229-9118  
*Good Morning from Great Britain*  
Wired for Sound Ltd., London N15

**T. Z. Sawyer Technical Consultants**

AM-FM-TV-LPTV

- FCC Applications & Exhibits
- Frequency Studies
- Experimental Authorizations
- Class Upgrades
- AM Directional Antennas
- STL Applications
- High Power Antenna Arrays
- Station Inspections

**1-800-255-2632**

FAX: (301) 913-5799 • 6204 Highland Dr. • Chevy Chase, MD 20815

**Contact Radio World Newspaper for availabilities**  
**P.O. Box 1214 Falls Church VA 22041**

**1-800-336-3045**



### TAPES/CARTS/REELS/CDs...WTS

Scotchart II's 320 3.5 min, \$2/ea; also some longer sizes, \$2.25/ea; lite use for up to 6 mo, some new music lengths available a so. B Lord, Lord Bcltg, 13313 SE 208th St, Kent WA 98042. 206-631-2374.

**TAPE WORLD**  
OUR 14TH YEAR  
WELL BEAT ANY PRICE  
4.99 SHIPPING ANY SIZE ORDER  
FREE CATALOG  
WE STOCK OVER 400 DIFFERENT AUDIO & VIDEO TAPES

Audiopak AA-4 over 1000 available, good condition, music lengths, \$1.75/each; Soundstacker II storage racks for 1000+ carts, \$.25/cart. G Jablonski, WHMI, POB 935, Howell MI 48844. 517-546-0860.

AOR prod facility deleting classic rock collection, all on 7" reels, \$300. 703-751-9346.

### MARATHON PRODUCTS COMPANY

Audio Cartridge Rebuilding Division

Rebuilding/reloading, like new, all brands, any length up to & including 3.5 minutes, \$1.95 ea. FOB out plant, 48 hrs delivery. (New rate effective 9/1/93)

**New NAB Marathon cartridges prices on request.**  
35 Years professional experience!  
Lifetime member AES R.D. MYERS Sr.  
Manufacturers of Audio Devices, Continuous Tape Mag.  
69 Sandersdale Rd. Charlton, MA 01507  
1-508-248-3157 or 1-508-853-0988

Circle (71) On Reader Service Card

Fidelipac 300s, approx 100 40s, 70s, some usable as is, some need reloading, \$1/ea for lot. B Oostenburg, KCKY, POB 6, Coolidge AZ 85228-0006. 602-723-5448.

Karsky's rewind loop carts. Also sell reconditioned carts. Service guaranteed. Call 605-348-9928.

#### Want To Buy

Fidelipac/Audiopak Mastercart II gold or AA-4 light blue in 2:30 through 4:00 lengths, must be in vgc, call after 3PM CST. 214-271-7625.

### TAX DEDUCTIBLE

#### Want To Sell

Production company creative community studio seeks donations of equip & finances. R Suraci, Fine Art Prod, 67 Maple St, Newburgh NY 12550. 914-561-5866.

Educ/non-profit AM-FM needs lw pwr xmtrs, prod, studio equip, s/h & receipt provided. Dr Newcomb, Grand River Radio, 19130 Nelson-Parkman, Garrettsville OH 44231. 216-548-2053.

School in ME needs 1 kW amp or FM xmt, modulation monitor or misc studio gear, will pay shpg. 207-255-4735 days; 207-255-4722 nights.

### TEST EQUIPMENT

#### Want To Sell

Hitachi V1150 quad trace 150 MHz scope w/on screen counter & DVM, will display in dBm, \$1085; Sound Tech 1700B distortion measurement syst w/auto set level, \$765. Wes, 818-798-9128.

Custom transmission measuring set, L, R, L&R, L-R, preset mod levels, precision attenuators, transformer isolation. D Johnson, DC Electronics, 2815 Pleasant Valley Rd, Cogan Sta PA 17728. 717-998-3169.

Nems-Clark 102E AM FS meter, case fair, panel meters clean, \$450. AC Elliott, Quitman Bcltg, POB 33, Quitman MS 39355. 601-776-6197.

**RCA Tube manual**, prefer the multiple volume black set although I'll settle for the single volume handbook. Must be: new enough to include Nuvistors. Other manuals will be considered if they include plate curves for all common tubes.  
Call Mike at 510-428-2002

HP 334A 5 Hz to 600 Hz, auto nulling, 0.1% distortion, AM detector covers 550 kHz to 65 MHz, excel cond w/manual, \$795; Bruel & Kjaer 2033 high res FFT sound & vibration analyzer, 0-20 kHz, 11 baseband ranges, amplitude of 40 dB, 80 dB & linear, excel cond w/manual, \$3995. R Summer, CAVU Corp, 3322 Applegate Ct, Annandale VA 22003. 703-968-8894.

#### Want To Buy

Neutrik test set, AP System One or Portable One. Wes, 818-798-9128.

### TRANSMITTERS

#### Want To Sell

Harris MW-1A solid state 1 kW AM, excellent condition, on air 1410 kHz, spares, \$8500. 816-628-5959.

Full Class A FM package with mix of new & used. Harris FM-2.5H3 transmitter, 8000A Optomod, ERI antenna, coax, studio, etc. Call 816-628-5959.

### DEMOED EQUIPMENT

BEXT Inc. has a few demoted exciters, amplifiers and STL's for sale. All demoted systems are sold first come first served and have the same 2 year warranty as BEXT's new equipment. For information:  
619-239-8462

Gates BC-1J 1 kW AM on 920 kHz, used as back-up for last 12 yrs, works but needs some TLC, no PCBs, \$1000/BO. B O'Connor, KDES, Palm Springs CA. 619-325-1211.

### FM - TRANSMITTERS

Factory new not used. Why buy a used Transmitter when you can own a new FM Transmitter for about the same cost? Call JIMMIE JOYNT at 214-335-3425.

Modulation transformer used in 10 kW AM/892R modulators, \$100; GE reactor, 1.0 henry at 4.5 amps, DC resistance 3 ohms, \$50. R Elm, WWJC, 1120 E McCuen, Duluth MN 55808. 218-626-2738.

Electro Impulse DPTC-25K FM dummy load, used twice, \$2150/BO. M Grubbs, POB 1047, Luling TX 78648. 210-875-2555.

BE FM5B 5 kW FM, 3 years old, with extra tube & spare parts kit. Tom, WRNX, Box 67, Amherst MA 01004. 413-256-6794.

AEL FM-25KG tuned to 107.5 MHz, on air 24-hrs per day, complete w/prints & manuals, BO. W Borneman, WBYN, 280 Mill St, Boyertown PA 19512. 215-369-7777.

**Exciters:** McMartin B-910 tuned and calibrated to your frequency, guaranteed. Mono, stereo, SCA, Goodrich Ent Inc 11435 Manderson St, Omaha, NE 68164. 402-493-1886 FAX: 402-493-6821

Collins 814-R1 excellent condition, available due to power up-grade, no exciter, new tube, \$5000. F Troiani, WMRF-WIEZ Radio, 12 1/2 E Market St, Lewistown PA 17044. 717-248-6757.

**NEW McMARTIN BF-5K**  
Lowest priced tube replacements

5500 W FM, broadband grounded grid output circuit, VSWR protection, excellent efficiency 75-80% automatic recycling & overload status. Fully remote controlled. FCC approved to 5500 watts.

### Goodrich Enterprises, Inc.

11435 Manderson Street  
Omaha, NE 68164  
402-493-1886  
FAX: 402-493-6821

Energy Onix MK30 30 kW FM transmitter, 3 years old, mint condition, with exciter, on 100.1 MHz, available early '94, with spare tubes/parts, \$27500. H Kneller, WEEJ, 3151 Cooper St, Punta Gorda FL 33950. 813-639-1112.

Harris MW1A 1 kW tuned to 1340, gd cond, off air 12/8/93, \$7000. John, Silver City NM. 505-538-3396.

RCA BTA 1R1 AM 1963 xmt, \$2500; RCA AM mod mon, \$200. P Bridges, KGKO, 202 E Cross, Benton AR 72015. 501-778-8257.

Gates FM5H 5 kW FM xmt on 95.9 w/McMartin BFM8000 exciter, just taken off air, w/xmt harmonic filter, \$10K/pkg. R Miller, WCNL/WTIM, Taylorville IL 62568. 217-824-3395.

Spare parts for CCA AM50,000D, incl HV transformer, mod. transformer, mod. reactor, HV filter choke, tube sockets and more. Call Transcom Corporation 800-441-8454 or 215-884-0888.

CCA Electronics has the following trade-in equipment for sale: Collins 831D2 2.5 kW FM with 310Z exciter. Also RCA BTA-50 50 kW AM & RCA BTA-10 10 kW AM. Please contact Steve, Howard, or Darin, 404-964-3530.

#### Want To Buy

FM xmt, 20-25 kW on 98.7. R Utnehrmer, WBDK, POB 338, Luxemburg WI 54217. 414-845-2922.

Gates 250 GY manual w/schematics. J Cunningham, KEOR/KHCK, RT 2 Box 113B, Stonewall OK 74871. 405-265-4496.

AM Transmitters up to 2.5 kW, prefer solid state Harris, Nautel or similar. Also want Optimod AM 8100B and AM Potomac FIM. Maxfield, FAX: 011-44-892-66-8118. (U.K.)

McMartin AM/FM xmt, any model, exciter or stereo modules. Goodrich Ent., 11435 Manderson, Omaha NE 68164. 402-493-1886.

### TUBES

#### Want To Sell

4CX250B, 4-400, 833, 813, 5CX1500, 4-1000, all types, full warranty EIMAC, Amperex, RCA, Westgate 800-213-4563.

#### For the Best Price

& 24 Hr service on transmitting tubes call 402-493-1886 day or night. FAX 402-493-6821.

## ECONCO

Quality Rebuilt Tubes  
Approximately 1/2 the Cost of New

Call for Our Price List

**800-532-6626**  
**916-662-7553**

**FAX 916-666-7760**

Circle (210) On Reader Service Card

### D and C Electronics Co.

Lowest Price on Tubes including:

4-1000A/3-1000Z/  
8B77/4CX250B/833A  
4-500/5-500/4-400/  
4CX 3500/5CX1500  
and much more!  
factory Warranty!

**1-800-881-2374**  
**(904) 688-2374**

Se habla Español  
FAX: (904) 683-9595

### REBUILT ELECTRON TUBES

**Partial List: 6623, 23791, TH150, 6425F, 5604, 6696, 6697, 5681, 5682, 5671, 7804, 3CX10,000H3, 3CX20,000H3, 4CX5000A, 4CX35,000C**

Worn out power tubes purchased

**Vacuum Tube Industries, Inc.**

**1-800-528-5014**  
**508-584-4500 X75**

# TRANSCOM CORP.

Serving the Broadcast Industry Since 1978

Fine Used AM & FM Transmitters and Also New Equipment  
For the best deals on Celwave products, Andrew cable and Shively antennas.

1 kW FM 1978 Collins 831C2	1 kW AM 1974 Harris BC1H1
2.5 kW FM 1978 CCA 2500R	1 kW AM 1978 Harris MW1A
3 kW FM 1975 CCA 3000D	1 kW AM 1988 Harris SX1A
3 kW FM 1982 Elcom Bauer 603B	5 kW AM 1968 CCA AM5000D
3 kW FM 1974 Harris FM3H	5 kW AM 1979 Continental 315F
5 kW FM 1979 CCA FM5000E	5 kW AM 1968 Harris BC5H
5 kW FM 1968 Harris FM5H	5 kW AM 1977 RCA BTA 5L
5 kW FM 1987 Harris FM5K	10 kW AM 1983 Harris BC10H

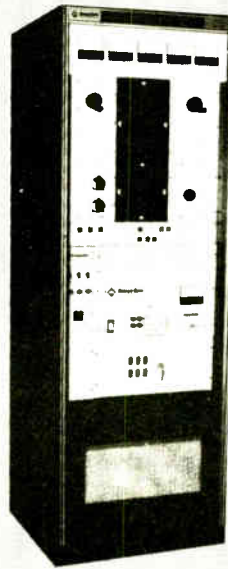
1077 Rydal Road #101  
Rydal PA 19046

800-441-8454 • 215-884-0888 • FAX No. 215-884-0738

Circle (25) On Reader Service Card

# Dare to Compare!

We challenge you to find all these features in any other transmitter....  
at any price!



The 'MK' Series  
FM Grounded Grid  
Transmitters from  
1.5kW to 50kW

- ✓ Built-in Solid State Emergency Transmitter
- ✓ Exclusive Controller Override System
- ✓ Built-in Line Surge Protection
- ✓ Exclusive '8 Time' Fault Recycling
- ✓ Automatic Power Level Control
- ✓ VSWR Foldback & Protection
- ✓ Lowest Operating Cost

Meeting the needs of Broadcasters Worldwide



"The Transmitter People"

**Energy-Onix**

752 Warren Street  
Hudson NY 12534


518-828-1690

FAX: 518-828-8476

Circle (186) On Reader Service Card



TUBES...WTS



**Svetlana**  
ELECTRON DEVICES

**Quality\* Power Tubes**

4X150A	4CX15,000A
4CX250B	4CX15,000J
4CX250BC	5CX1500A
4CX250R	5CX1500B
4CX350A	8560AS

- Watch this list grow.
- Manufactured in Russia's largest power tube factory.
- Generous warranty based on high quality.
- Honest prices based on quality at low cost.
- Shipment from USA stock.

**Broadcasters**  
Call: 800-239-6900  
FAX: 205-880-8077

**OEMs, Distributors, Volume Purchasers**  
Call: 415-233-0429  
FAX: 415-233-0439

Circle (1) On Reader Service Card

**Want To Buy**

VACUUM POWER TUBE REBUILDERS SINCE 1940

Freeland Products, Inc.

"If you don't need TO SAVE MONEY we can't help you."

However, if saving money interests you... WE CAN REBUILD YOUR DUDES (used tubes) for about 1/2 the cost of new tubes!

Call TODAY 1-800-624-7626 For a FREE Information Packet

WE BUY MANY TYPES OF USED TUBES

**TURNTABLES**

**Want To Sell**

Technics R&B SL1015 w/SP15 3 speed TT w/9% speed variation & readout, EPA-500 tonearm all mounted on obsidian base & plexiglass dust cover; also have 3 tonearm shafts for high, medium & low compliance cartridges including 78 rpm, will consider selling tonearm shafts separately to anyone owning EPA-500 tonearm, perfect cond, \$975. L Snyder, MB Inc, Box 182, Floral Park NY 11001. 718-347-2940.

Technics SL-1200 MK2 (2), \$275 ea; RCA BQ-70F 3 speed, 16" transcription TT w/Shure 16" tonearm, completely rebuilt, \$150. G Dunn, No Cal News, 5383 Willow Lance Ct, Byron CA 94514. 510-516-0299.

JVC CD-4 disc demodulator, lw hrs, \$50. 703-751-9346.

Russco Cue Master, 33, 45, 78 rpm, gd cond, \$150. V Coleman, WXTK, 278 S Sea Ave, W Yarmouth MA 02673. 508-775-7400.

Rek-O-Kut TT with tonearms & stereo preamps, \$300 ea. P Bridges, KGKO, 202 E Cross, Benton AR 72015. 501-778-8257.

QRK-Russco TTs (3), \$40 ea or all for \$100 plus shpg. L Houck, Rollin Recdg, 210 Altgelt, San Antonio TX 78201. 210-736-5483.

Technics SP-15 (4), excellent condition, tonearm, case, manuals, isolator feet, \$350. J Rarst, KRRV, 1515 Jackson St, Alexandria LA 71301. 318-442-1410.

Technics SP-25 direct drive turntables (3), gd cond, \$150/ea or BO. M Skinner, KSGI, 801-628-1000.

Several Russco, Gates & Quick-Kut TTs w/wo tonearms, \$50/ea. R Miller, WCNL/WTIM, Taylorville IL 62568. 217-824-3395.

**Want To Buy**

Record cutting lathes, 16" tables/arms, SME-3012, 45/78 records. 612-866-6183.

**ADVERTISING SPACE IS AVAILABLE!**

Call **800-336-2045** for more information!

# ACTION-GRAM

**Equipment Listings**

Radio World's Broadcast Equipment Exchange provides a FREE listing service for radio stations and recording studios only. All other end users will be charged. Simply send your listings to us, following the example below. Please indicate in which category you would like your listing to appear. Mail your listings to the address below. Thank you.

Please print and include all information:

Contact Name \_\_\_\_\_

Title \_\_\_\_\_

Company/Station \_\_\_\_\_

Address \_\_\_\_\_

City/State \_\_\_\_\_

Zip Code \_\_\_\_\_

Telephone \_\_\_\_\_

I would like to receive or continue receiving Radio World FREE each month.  
 Yes  No

Signature \_\_\_\_\_ Date \_\_\_\_\_

Please Circle only one entry for each category:

**I. Type of Firm**

D. Combination AM/FM station	F. Recording studio
A. Commercial AM station	G. TV station/teleprod facility
B. Commercial FM station	H. Consultant/ind engineer
C. Educational FM station	I. Mfg. distributor or dealer
E. Network/group owner	J. Other _____

**II. Job Function**

A. Ownership	G. Sales Manager
B. General management	E. News operations
C. Engineering	F. Other (specify) _____
D. Programming/production	

Brokers, dealers, manufacturers and other organizations who are not legitimate end users can participate in the Broadcast Equipment Exchange on a paid basis. Line ad listings & display advertising are available on a per word or per inch basis.

WTS  WTB  Category: \_\_\_\_\_

Make: \_\_\_\_\_ Model: \_\_\_\_\_

Brief Description: \_\_\_\_\_

Price: \_\_\_\_\_

WTS  WTB  Category: \_\_\_\_\_

Make: \_\_\_\_\_ Model: \_\_\_\_\_

Brief Description: \_\_\_\_\_

Price: \_\_\_\_\_

WTS  WTB  Category: \_\_\_\_\_

Make: \_\_\_\_\_ Model: \_\_\_\_\_

Brief Description: \_\_\_\_\_

Price: \_\_\_\_\_

WTS  WTB  Category: \_\_\_\_\_

Make: \_\_\_\_\_ Model: \_\_\_\_\_

Brief Description: \_\_\_\_\_

Price: \_\_\_\_\_

# ADVERTISER INDEX

This listing is provided for the convenience of our readers. Radio World assumes no liability for inaccuracy.

Page No.	Advertiser	Reader Service No.	Page No.	Advertiser	Reader Service No.
25	AMP Services	105	3	Hnat Hindes	33
7	ATI	50	22	ITC	156
28,29	Arrakis	164	49	J & J Audio/Video	48
7	Audi-Cord	97	40	J Squared Technical Service	30
25	Audio Broadcast Group	151	18	J.R. Nelson	38
2	Audioarts/Div. of Wheatstone Corp.	6	12	LPB	118
42	Audiopak	46	40	LPB	20
55	Auditronics	116	53	Marathon Products	71
40	Autogram	194	26	Marti	132
23	BSW	123	31	Marti	120
26	Belar	79	46	Micro Technology Unlimited	14
24	Benchmark Media Systems	64	25	Monroe Electronics	36
31	Bext	9	13	Murphy Studio Furniture	77
32	Broadcast Devices	125	48	Myat	161
35	Broadcast Electronics	109	38	NAB	-
4	Burk Technology	85	40	Omega Scientific	43
33	Burk Technology	197	10	Orban/AKG/dbx	183
39	CCA Electronic.	53	45	Pacific Recorders	141
43	California Digital	12	25	Precision Multiple Controls	13
25	Cellcast Communication Product	59	40	Priority Leasing Corp.	7
24	Circuit Werkes	128	25	Pristine Systems	174
20	Computer Concepts Corp.	26	37	QEI	56
3	Comrex	167	41	RE America	187
40	Comrex	145	34	Radio Advertising Bureau	211
14	Continental Electronics	113	17	Radio Programming & Mgmt	181
21	Cutting Edge	115	49	Radio Resources	2
41	Dataworld	209	11	Radio Spirits	42
15	Delta Electronics	69	32	Russ Friend & Associates	39
11	Dick Brescia Associates	158	40	S.C.M.S.	66
32	Econco	16	36	Scott Studios	147
53	Econco	210	32	Shively Labs	131
18	Energetic Music	61	8	Siel	171
53	Energy-Onix	186	33	Sine Systems	72
9	Fidelipac	100	54	Svetlana	1
19	Fidelipac	201	40	Svetlana Electron Devices	76
30	Fidelipac	204	47	Telos	135
18	Ghostwriters	102	32	The Management	108
32	Gorman Redlich	62	32	Third Story Recording	148
49	Hall Electronics	163	53	Transcom Corp.	25
1	Harris Allied Broadcast Equip.	74	49	USA Foam	94
6	Harris Allied Broadcast Equip.	17,81	56	Wheatstone	92
16	Harris Allied Broadcast Equip.	19,206	25	Zephyrus Electronics	10
27	Harris Allied Broadcast Equip.	35,170	32	Zercom	217

Publisher .....Stevan B. Dana  
Associate Publisher .....Carmel King  
Marketing Consultant .....Al Leon  
Marketing Assistant .....Annette Deutscher  
Production Director .....Kim Lowe  
Production Manager .....Julianne Stone

Production ...Vicky Baron, Lisa Lyons, Lisa Mamo  
Ad Coordinator .....Regan Deatherage  
Ad Coordination Manager .....Simone Mullins  
Circulation Director .....Tiana Hickman  
Circulation Manager .....Rebecca Seaborg  
Accounts Receivable .....Steve Berto

**Advertising Sales Representatives**

U.S. East: Skip Tash .....703-998-7600 Fax: 703-998-2966  
U.S. West: Dale Tucker .....916-721-3410 Fax: 916-729-0810  
International: Stevan B. Dana .....+1-703-998-7600 Fax: +1-998-2966  
Europe: Dario Calabrese .....+39-2-753-0274 Fax: +39-2-753-2697  
Japan: Eiji Yoshikawa .....+81-3-3327-2688 Fax: +81-3-3327-3010

Free Subscriptions are available upon request to professional broadcasting and audiovisual equipment users. For address changes, send current and new address to RW a month in advance at P.O. Box 1214, Falls Church, VA 22041. Unsolicited manuscripts are welcomed for review: send to the attention of the appropriate editor.

\*Closing for listings is the first and third Fridays for the next month's issue. All listings are run for 2 issues unless pressed for space or otherwise notified by listee.

**Broadcast Equipment Exchange**  
PO Box 1214, Falls Church, VA USA 22041  
Phone: 703-998-7600 FAX: 703-998-2966





Andy & Debbie Montgomery and Capt'n. Pat Adams, the morning team at KIX-106 in Memphis, Tennessee.

# We Make a Good Team!

KIX-106 is the number one country music radio station in the Memphis area. When they decided to remodel and expand their studios, the most carefully researched item on the equipment list was a new console for their on-air studio.

So they purchased the Auditronics 800 Series console.

Doug Gossett, their engineer, said some really great stuff about it, but we didn't want to get technical. Let's just say the specs are definitely superior.

However, Andy Montgomery, one-third of the KIX-106 morning team, said some really good stuff too... "Our entire studio is designed around the Auditronics 800. You might say that the 800 and, of course, Debbie are at the center of everything (Debbie's my wife, so I had to say that). It's reliable and it's sturdy. Have you ever spilled a cup of coffee or a soda on your console and everything shuts down? I don't recommend it, but so far this hasn't been a problem for the 800. It's so versatile. It does everything I need and it always works. That sure makes my job a lot easier. Debbie, Cap'n Pat, the 800 and I make a good team!"

"It's hectic on our morning show and we get lots of phone calls, especially Debbie. This new telephone mix minus system makes them so much easier to handle."

"There are always the three of us on the air in the morning, but it's not unusual to have 5 or 6 people in the studio and on the air at the same time ... plus the music, the commercials and the phone calls. And we still haven't begun to max out the console. It's so reliable that I don't think Doug has had to make even a minor adjustment or anything since we started using it."

If you want to find out what Doug and other users had to say about the Auditronics 800 console, call your favorite Auditronics dealer or Auditronics today.

*The Sound Of Perfection*

**AUDITRONICS**

3750 Old Getwell Road, Memphis, TN 38118  
901-362-1350, FAX: 901-365-8629



# *The Closer You Get...*

**WE MEAN IT**—we really DO provide the quality, performance, technical support, and innovation we promise!

Our model A-500 is a thoroughly engineered on-air console: it delivers the level of performance your clients now expect, and DAB demands. All components are selected for long life—gold bus connectors, gold I/O connectors, all gold contact switches, gas-filled relays, triple burned-in integrated circuits, solid state ON/OFF lamps, and precision laminated Lexan control surfaces for a lasting, wearproof finish. And we back that up with a 3-year parts and labor warranty, complete with

factory support from a technically competent and responsive staff.

We've also handled your special requirements as well with a super family of accessories, including a choice of three different telephone modules, an intercom module, an off-line mixer module for your remote feeds, talent control stations, accessory panels, failsafe power supplies, and auto cart and CD sequencing options.

**So take a close look:** we've got the quality, we've got the innovations, and you've got our commitment to top-notch support.



# *The Better We Look!*

*A-500*