

# Radio World®



**George Marti,  
Then and Now  
See Page 31**

Vol 21, No 7

Radio's Best Read Newspaper

April 2, 1997

## DARS Hits the FCC Auction Block

by Lynn Meadows

**WASHINGTON** If you knew five years ago what you now know, would you change any of your decisions? Would you have popped the question, bought that house or invested that money in the stock market?

"The answer is yes," said a philosophic David Margolese when asked if CD Radio would have gotten involved with satellite digital audio radio services (DARS) seven years ago if he knew then what he knows today. "Nothing is easy in this world."

The other three DARS applicants agreed. When they applied for DARS licenses in 1992, no one could have predicted that the Federal Communications Commission would soon turn to spectrum auctions as a way to help swell

federal coffers. And no one could have known that in January 1995, when the FCC approved 50 MHz (2310-2360 MHz) of spectrum for DARS and the applicants agreed they could share it, that the spectrum allocation for DARS would eventually be whittled down to 25 MHz.

### No regrets

Still, despite the fact that the auction scheduled for April 1 involves only two licenses, none of the applicants sounded defeated. After all, each 12.5 MHz spectrum license will allow its licensee the chance to offer between 19 and 44 CD-

quality audio channels.

"From a business perspective, the order is great except for the auctions," said Lon Levin, president of American Mobile Radio Corp. (AMRC). He said he was pleased the FCC will allow terrestrial repeaters and advertiser-supported DARS.

— Lon Levin  
AMRC "We really believe in this business," said William

Caldwell of Digital Satellite Broadcasting Corp. (DSBC). He said his group is just excited about the fact that they can move forward now — a sentiment echoed by the other proponents.

DSBC originally applied for its DARS license in December 1992.

"I think it's worthwhile still being in the game," said Clifford Burnstein of Primosphere. (This company also submitted its DARS application in December 1992.)

"At the end of the day, the effort is worthwhile," agreed Margolese. CD Radio jumped into the fray in May 1990, when it petitioned the FCC to move forward with DARS.

**From a business perspective, the order is great, except for the auctions.**

## ITC Product Lines Find New Owners, New Life

by Lynn Meadows

**BLOOMINGTON, III.** "Our products are legendary," boasted the website for International Tapetronics Corp. Sadly, legendary products are no guarantee against insolvency.

That lesson forced the 28-year-old ITC to sell its product lines and close up shop. On Feb. 22, virtually everything that remained of the well-known cart and tape manufacturer, from waste baskets to water fountains, was sold at auction.

The good news is that no one with an ITC product is without support. David Hirschfield of the Stonegate Group in Chicago took on the task of selling the ITC product lines in early 1996.

"The parts were worth more than the whole," Hirschfield said in explaining why the company was not simply sold outright. Three companies became the new owners of the various ITC product lines.

Audiopak bought the cart tape line last summer. In December, DRS Ahead Technology Inc. purchased four ITC cart machine lines, including the Delta Series, the Series 1, Series 2 and Series 99B cart machines, the ESL V Eraser/Splice Locator and ITC's DPR-612 Digital Program Repeater.

Finally, Audio Pro Technologies was scheduled to acquire the ITC Audio Switcher in March. The DigiCenter, another well-known ITC product, had been developed and manufactured by APT's par-

ent company, which retained the rights to it.

International Tapetronics Corp. was founded in 1969 by Jack Jenkins. Elmo

See ITC, page 11 ▶

**Meet Senate Communications Subcommittee Chairman Conrad Burns. See page 20.**



## Gulfstar: Price, Not DOJ Investigation, Nixed Demaree Deal

*Justice Also Settles in Cox and ARS Deals*

by Matt Spangler

**WASHINGTON** The Department of Justice is now doing a different kind of financial review — taking credit where it isn't due.

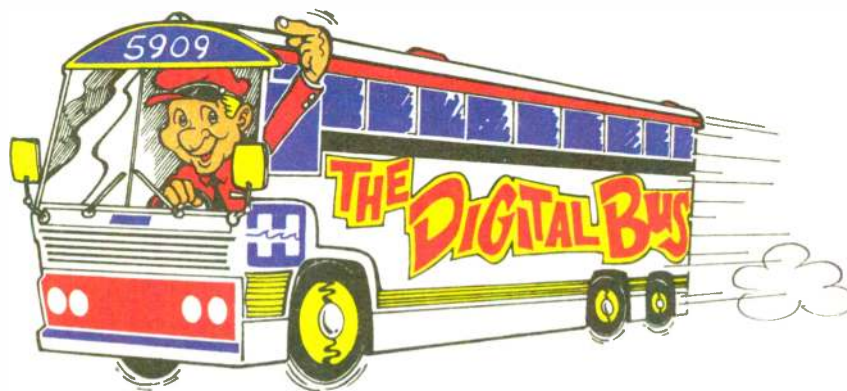
A Justice Department press release last month claimed that Gulfstar Communications gave up on its attempts to acquire three northwest Arkansas radio stations after the department expressed antitrust concerns about the deal.

Gulfstar spokeswoman Lisa Dollinger said that simply isn't true. "Gulfstar never had a contract with Demaree. We couldn't agree on a price to be paid, so it never got to contract," she said.

The farthest the deal ever got was a letter of intent, released by Gulfstar months ago. Demaree announced the letter of intent, followed by an announcement

See GULFSTAR, page 14 ▶

## Going Digital?



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# NEWSWATCH

## NAB Defends Broadcasters' Community Service Commitment

**WASHINGTON** Federal Communications Commission Chairman Reed E. Hundt said last month that broadcasters aren't doing enough Public Service Announcements, and the National Association of Broadcasters is steamed.

At the CTIA Wireless Convention and Expo in San Francisco, Hundt said that "competition for advertiser revenue had led to a dramatic increase in self-promotional ads on TV in prime time ... This has come at the expense of PSAs, which have dried up and disappeared like rain in the desert." His remarks came in the

context of a speech partially about whether the airwaves should be considered a public utility.

NAB President Edward O. Fritts lashed out at Hundt in a written response. "I find it ironic that your comments were made the same week that local television and radio stations from Arkadelphia, Arkansas, to the Ohio River Valley are being praised for their outstanding service to the public during the tragic tornadoes and flash flooding that struck the Midwest last weekend," he wrote.

Fritts went on to point out other means by which broadcasters reach out to their communities, such as fundraising, AIDS education efforts and literacy campaigns. He also cited surveys that demonstrated

the effectiveness of anti-alcohol PSAs.

At press time Hundt's office could not be reached for comment on the letter.

## VOA Developer Wins NAB Engineering Award

**LAS VEGAS** The 1997 Radio Engineering Achievement Award will go to George Jacobs, who was instrumental in developing and launching Voice of America and modernizing the facilities of Radio Free Europe and Radio Liberty. He will receive the award on April 9, during the NAB '97 Technology Luncheon.

Jacobs, president of the radio consulting engineering firm George Jacobs & Associates Inc., is recognized worldwide

in shortwave broadcasting, having represented the United States at a number of international telecommunications conferences and having been instrumental in establishing several FCC-licensed shortwave broadcast stations.

## CBS OKs LMA in Los Angeles

**NEW YORK** CBS Radio had to give up stations in Boston, but it upped the ante in Los Angeles.

The radio division of the newly named CBS Corp. agreed to swap WBOS(FM) and WOAZ-FM in Boston and WMMR(FM) in Philadelphia for two Greater Media stations in Los Angeles.

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# What's up With Public Interest?

by Matt Spangler

**WASHINGTON** In February, state broadcasting associations came to Washington to share their concerns with federal lawmakers as part of the NAB State Leadership Conference. The question of how broadcasters can fulfill their public interest obligations dominated much of the talk.

FCC Chairman Reed E. Hundt offered a definition: "The core purpose of the public interest requirement is to encourage broadcasters to do something other than what they would normally do to be commercially successful." His chief of staff, Blair Levin, said the FCC probably will issue a report and order soon, defining the public interest obligation more clearly. Hundt also said Vice President Al Gore has set up a commission to tackle a number of broadcast issues, among them the public interest requirement for new digital broadcasters.

Rep. Billy Tauzin criticized the president's budget proposal that calls for \$36.1 billion to be collected in spectrum auctions over five years. Tauzin said making broadcasters pay for fulfilling public interest requirements is inconsistent. Rep. Edward Markey suggested that public interest obligations should be a component of spectrum auctions, so that money is not the sole determinant of who gets licenses.

## Spectrum auctions

Markey suggested that licenses should go to whoever passes on the most savings to consumers. (The idea of charging the public for using the new digital media has been bandied about in Washington.)

Clearly, a lot of work remains to be done on this issue. Like his GOP colleague Tauzin, Sen. Trent Lott criticized the spectrum auction component of the

president's budget, saying Clinton had asked for \$11.1 billion more than Congress had originally agreed to. He said the source of this money was still unclear. Tauzin said auctions would be a better alternative to the competitive hearings process, but that they should not be used as a solution to budgetary difficulties.

FCC Mass Media Bureau Chief Roy Stewart expressed concern over the possibility of congressional resolution of the debate — Sen. John McCain recently sent a letter to Hundt advising him that the current system be replaced with an auctions-based one.

Hundt also said he would like to open the DARS auctions to applicants beyond the four major providers of the digital satellite service already proposed. "The auction should be open to anyone who thinks they can make a business out of DARS," he said. This, as we know, did not come to pass.

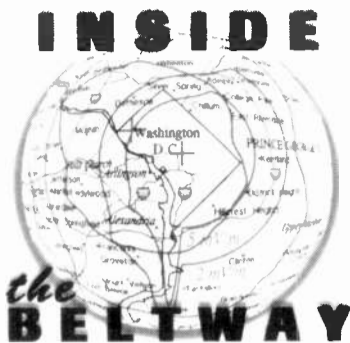
## Campaign finance reform

McCain has also co-sponsored a bipartisan campaign finance reform bill that would give free airtime to politicians as a means of reducing campaign expenses. Lott questioned who would ultimately pay for such a measure; he assured the audience that it would not be the American public, that the budget would not be used to finance elections.

Tauzin was more vocal, calling McCain-Feingold "outrageous" and "a First Amendment violation." He suggested

that public broadcasting, subsidized by the government, could be used as a forum for politicians during elections.

Hundt said the new digital media might help reform the political process, and that the Gore commission will address the issue as well.



## A Roundup of News and Comment From the Nation's Capital Affecting Radio

news should please the NAB; the association may not agree with DOJ that radio should be defined as a separate market in competition reviews, but NAB does seem to find Klein a reasonable man to deal with.

As a side note, Klein will speak at NAB '97 on April 7, as part of the Broadcasters' Law & Regulation Conference. He is expected to relay much of the same message he delivered at NAB's Group Head Fly-in (RW, March 19).

NAB is not so pleased with the FCC. Is the commission duplicating the competition analyses of the DOJ in its review



Rep. Edward J. Markey

of license transfers that result from mergers and acquisitions? The commission and the Republicans disagree, and NAB has made no secret of its concern that the FCC may be holding up its reviews until the DOJ comes back with its own results.

Perhaps at the behest of the NAB, Sen. Conrad Burns drafted a letter to the commissioners accusing them of enforcing "a policy which adds unnecessary regulatory hurdles, and therefore circumvents congressional intent," meaning the Telecom Act.

Burns' fellow Republicans joined in at the conference: Lott expressed concern that the FCC may be misinterpreting the law. Tauzin warned the commission against regulating where it shouldn't. The next day, Tauzin sent his own memo — almost a carbon copy of Burns' — to the commission.

Two days later, the Senate Appropriations Committee got into the act. Commerce, Justice, State and

See BELTWAY, page 7 ▶

## NEWSWATCH

▶ NEWSWATCH, continued from page 2

KLSX(FM) and KRLA(AM). CBS said that this arrangement satisfies the Department of Justice mandate that CBS spin off WBOS and WOAZ in order to receive the department approval of the CBS merger with Infinity Broadcasting, which created the world's largest radio group. CBS now has eight stations in Los Angeles, the maximum allowed by the Telecommunications Act.

The deal is still subject to Federal Communications Commission review.

CBS will operate the Los Angeles stations under a local marketing agreement, and Greater Media will do the same with the Boston and Philly stations. This arrangement is pending review by DOJ.

Mel Karmazin, CBS Radio chairman and CEO, said of the deal: "This combination will offer advertisers a strong alternative to advertising in the Los Angeles Times." The radio industry has criticized the DOJ insistence that radio be considered a separate medium when determining market share created by mergers and acquisitions.

Meanwhile Scott Herman was named senior vice president, news, of CBS Radio. He is responsible for CBS News' radio operations, including newsgathering and programming, as well as its relationship with its affiliates. He will remain

vice president and general manager of WINS(AM) in New York.

## Talk's Oscars Awarded

**BOSTON** A prominent industry association bestowed upon veteran talk show hosts David Brudnoy and Michael Jackson its own version of Academy Awards.

The National Association of Radio Talk Show Hosts voted to give Brudnoy The Freedom of Speech Award and Jackson The Talk Show Host of the Year Award.

NARTSH President Blanquita Cullum said Brudnoy, libertarian/conservative host of "The David Brudnoy Show," heard on WBZ(AM) in Boston, was chosen for having "the talent and courage to address controversial, often unpopular, issues."

Jackson, host of "The Michael Jackson Show," heard on KABC(AM) in Los Angeles, has built a reputation as a liberal talk show host in a field populated by conservatives. He was cited for, among other things, "his personal enlightenment of the public on international, national and local issues ..."

The awards will be presented at NARTSH's annual convention, June 19 - 21 in Los Angeles.

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# Country Radio: Telling It Like It Is

**WASHINGTON** Living "inside the beltway" makes for some interesting moments. And while some feel that residents of that political sphere tend to take themselves too seriously, the truth is that some of what they do can have a direct impact on the daily life of the radio business.

With that in mind, **RW News Ace** (and Associate Editor/News) Matt Spangler will proffer a regular roundup of news and commentary from the nation's capital affecting radio. Look for his inside scoop in the news section on a regular basis. Hey, and if you have a scoop to share with him, by all means give him a call or drop him an e-mail.

## Country show report

**Tuned In** Editor Whitney Pinion just returned from the Country Radio Seminar in Nashville. Always a great show, CRS ranks up there with some of the best times I've had covering radio trade shows.

I asked her to fill us in on what the Country side of the business is doing and thinking these days, and what she had to say was pretty interesting.

More than 2,200 attendees were trying to make some sense of recent research and negative press that suggests the glory days of country music are over. Particularly interesting, reports Whitney, was a standout session, "The State of Country: A Trend Report." At CRS-27, researchers Roger Wimmer and Matt Hudson of The Eagle Group presented the results of a detailed survey of country radio listeners' lifestyles and media usage habits. This year, Wimmer and Hudson followed up with an updated trend report of their 1996 National Country Radio Audience research study.

Wimmer and Hudson acknowledged that people are saying that country radio is dying, and their goal was to find out what's really happening. One of the key findings of the study is that time spent listening (TSL) is up, while cume appears to have stabilized. The number of respondents who reported listening "often" to country radio jumped from last

year's figure of 55 percent to 66 percent — a leap that was beyond the survey's margin of error. Those who reported listening "sometimes" dropped from 45 percent to 34 percent.

Numbers can be massaged to mean different things. But the underlying fact is that radio's core audience is stable and huge. It's the fringe listeners that are going back to their first format choices.

Panelists like Bob Moody, a consultant for McVay Media, and Jaye Albright with Radio IQ, were tougher on the business. They suggested that the industry should stop comparing its numbers to 1993 and 1994 boom years. In fact, Moody suggested that it is the media's attention to Country music that is cyclical and not the loyalty of the audience or the growth of the format.

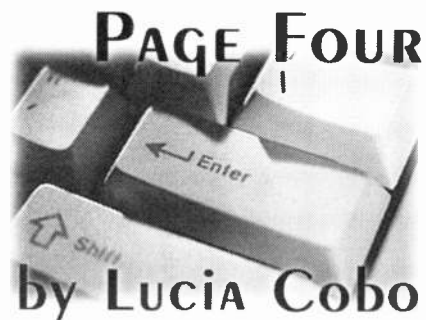
Albright added: "This (study) certainly indicates that we're building on bedrock," he said.

"I mean, we're the 900-pound gorilla among music formats."

Independent Programming Consultant Rusty Walker asked country radio folks to step outside their bubble of day-to-day operations for better perspective. "I think there is information here and elsewhere that shows that the scary thing is, right now, people who consume our product have a higher opinion of it than those of us who create it," he said. "We've got to be very, very careful."

In **RW** we write about consolidation all the time. And consolidation was a big topic of discussion at the CRS. Albright suggested that the reason the recent ebb in country radio is even scarier now than at other points in the format's history is that it never happened when the radio industry was simultaneously being shaken up by consolidation.

Of course, consolidation is an issue for all radio stations, regardless of format. But one of the CRS-28 sessions dealt specifically with the effect of the 1996 Telecom Act on country radio. During "The New Telecom World: How to Survive and Prosper," managers offered suggestions for handling change and provided insight on how consolidation is



uniquely affecting country radio stations.

Becky Brenner, general PD of American Radio Systems stations KMPS-AM-FM, KZOK-FM and KBKS(FM), detailed all the economic benefits her stations are reaping as a result of consolidation. She suggested that clusters of stations re-negotiate their contracts with news and traffic providers as well as digital equipment and software vendors.

Brenner also noted the positive and

negative effects of sharing employees between stations. While working for more than one station can make an individual employee more valuable to the company, it may unfortunately spell termination for someone else.

Conversely, she pointed out, some times, positions have been created that never existed in the past.

Bob Neil, executive VP of Radio for Cox Broadcasting, was less interested in being positive and more interested in being direct, said Whitney. He compared the radio industry in 1987 to the industry today and made several targeted points. Today, stations are businesses, he said, and programmers and other personnel cannot live in a vacuum.

So what's in store for the format? That was the topic at the session "The Future of Country Music." Again, perspective is important when considering country's future. It is still the most popular format in the United States.

Though country does face its share of challenges, the future looks bright for radio's strongest format.

## Country Radio Seminar Showcases New Faces



Pictured in the bottom row (seated) are Asylum's Kevin Sharp, Capitol Nashville's Deana Carter; front row: Roger Sovine (BMI), Atlantic's Mila Mason; Curb's Jo Dee Messina; Epic's James Bonamy; Harry Warner (BMI); CRB President Ed Salamon; MCG/Curb's LeAnn Rimes; Patsy Bradley (BMI) and Curb's David Kersh. Pictured in the back row l to r: Charlie Monk (Monk Family Music/CRB); Bill Mayne (Warner/Reprise) Warner/Reprise's Paul Brandt; Joyce Rice (BMI); David Preston (BMI); Warner Bros.' Bill Engvall; Capitol Nashville's Trace Adkins and Columbia's Darryl Dodd.

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### Lessons of FM

Dear RW,

I was interested in the column by Ed Montgomery ("Lessons From the History of FM," Feb. 5).

I went to work at WGY-WGFM-WRGB General Electric, in Schenectady, N.Y., in August 1945, after leaving the service. I was assigned to WGFM, which was the second full-time FM station in the country. WBCA in Schenectady was the first. It was owned by Dr. Edwin Armstrong, built by GE and managed by Leonard Asch. Both were on the 42-50 spectrum.

At the time, GE was bringing in prospective FM buyers to the Hotel Ten Eyck in Albany, to woo them with their products. Every Saturday morning, WGFM would broadcast a live half-hour of music, which was received at the hotel where the buyers could hear the superiority

of the signal. Ed Rice conducted the small symphony group; Frankie D'Armand led a six-piece jazz band; Rufus Wheeler conducted the Sweet Sixteen, a fine choral group. There were other musicians as well. I did all the announcing for this series in the fall of 1945. Wondering why I did all of it? The production director confessed that I was the only announcer they could not hear breathing at the microphone.

FM in those days carried a full range of frequencies up to 20,000, and any extraneous noise was amplified — most announcers sounded like they were gasping for breath. I was told by the engineers that the frequency range of the mics was lowered by 7,500 cycles, the same as AM, to do away with the problem. I would expect this holds today. The music was always transmitted at its full range.

*George Michael  
Merrimack, N.H.*

### EAS: Complete farce

Dear RW,

Tom Taggart's Guest Commentary was right on the money ("EAS Is Little More Than Excuse for Fine," Jan. 22). EAS, like its predecessors EBS and CONELRAD, is a complete farce thrust upon broadcasters and the public by the idiotic bureaucracy he describes.

Here in Mississippi our stations routinely air watches and warnings for tornadoes, severe thunderstorms, floods, etc. We've been doing it for years and will continue to do so. We don't need an expensive and complicated "magic box" thrust upon us by the government. That's money that could be better spent serving our community.

Perhaps EAS is the government's way of sending a message to the 10-in-a-row jukeboxes that won't stop their music sweeps just because a tornado is heading towards a nearby community.

Yes, I'll hook up the new EAS unit and do the silly tests, but I damn sure won't have my station automatically rebroadcast alerts originated by our local primary or from the NOAA weather radio announcers who can't even pronounce the names of the counties involved. As far as local alerts are concerned, we'll just keep doing it like we always have: the right way!

*Larry G. Fusz  
President and General Manager  
Delta Radio Inc.  
Cleveland, Miss.*

### Amen, Tom

Dear RW,

Amen to Tom Taggart's commentary. He has masterfully put down on paper what thousands of us have felt for years. I applaud his spirit in speaking out on this politically incorrect topic.

My experience in 20-plus years of station ownership is that even in local emergencies, local authorities have no idea when or how to declare an "actual emergency," and all broadcasters are better equipped to handle this in their own way. During a recent flood situation in our

## No Small Matter

His last name means "small" in German, but Joel Klein is looming as a big player in the post-Telecom world of radio. Anyone who cares about their future in this business should make a special effort to hear him speak at NAB '97.

President Clinton nominated him to the post of assistant attorney general of the U.S. Department of Justice Antitrust Division, a position in which

Klein had been acting since last fall. He is the point man for DOJ's review of radio and TV mergers, LMAs and other ownership deals that fall under the rubric of consolidation. Until 1996, antitrust just wasn't a big concern for broadcasters, whose holdings in a given market were limited. The world is different now.

Klein's opinions matter. Justice has taken the position that radio mergers can be anti-competitive in certain situations, even when the ownership limits of the Telecom Act are complied with. Radio managers must understand the implications of antitrust regulation. How does Justice define a "market," and should radio be defined as a market unto itself? How does the Hart-Scott-Rodino review process work? At what point does a proposed radio grouping in one market cross the antitrust threshold? What about format monopolies?

Klein is willing to talk to broadcasters. He came to the Group Head Fly-In in February, spoke at length about his department's methods of looking at radio and other industries, and now has agreed to offer remarks and take part in an "open, informal dialogue" during the Broadcasters' Law and Regulation Conference at NAB '97.

"Station Consolidation and the Department of Justice — A Dialogue" will be held Monday, April 7 at 2 p.m. in Room 242 of the Las Vegas Convention Center.

We commend Klein for coming to the table, and salute NAB for arranging these meetings. Radio people would do well to attend. Bring your questions, get there early and expect a crowd. Few regulators have such an important role in the radio landscape today.

—RW

# Radio World

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**Next Issue of Radio World**  
**April 16, 1997**

county, I had to call the Civil Defense director and tell him to declare the emergency his law enforcement people requested. When we felt it was over, we "officially" ended it. That was several years ago and the director still has never called back to proclaim the emergency ended.

This is just another example of government control ... because they can!

*Gary L. Hawke  
William Allen White School  
of Journalism and Mass  
Communications  
University of Kansas  
Lawrence, Kan.*

**Write us at:**  
**Radio World Readers Forum**  
**PO Box 1214**  
**Falls Church, VA 22041**  
**E-mail:**  
**74103.2435@compuserve.com**

### Stretched thin

(The following letter was sent to the National Association of Broadcasters. It is reprinted with permission of the writer.)

Dear NAB,

According to RW ("NAB Hikes Booth Fees," Jan. 22), the NAB did not receive any letters of complaint regarding the increase of exhibition fees in 1996. I want to enter a letter of complaint for the NAB '97 and subsequent shows.

As a small manufacturer, Autogram's budget for the NAB show space has been stretched almost beyond its elastic limit. Sales have leveled off, leaving us to consider the alternative — decreasing our booth size. The NAB is privileged to have customers lined up to pay any price for show space. We do not have that privilege.

As reported in the article, the NAB sold 648,965 square feet at \$25 per square foot for the '96 show, which computes to \$16,224,125. For the '97 show, as of late December, 709,862 square feet has been sold for \$27 per square foot, for a total of \$19,166,274 — the difference being \$2,942,149. It is difficult to believe that the addition of a few more exhibitor personnel riding shuttle buses and increased security would cost almost \$3 million.

Remember we, as exhibitors, pay extra for carpet, sets, power, drayage, hot dogs and other unknown costs. The NAB provides only "X" amount of bare concrete floor.

The '97 show marks 36 years of my participation in an NAB show (the first was in the basement of the Conrad Hilton Hotel in Chicago in 1961). The NAB of today aims to be the biggest electronic show but forgets that the "B" in NAB is for *broadcasting*.

Bigger is not always better.

Thank you for hearing my complaint.  
*Ernest T. Ankele, Jr.  
President, Autogram Corp.  
Plano, Texas*

### Correction

The 1997 Industry Sourcebook, a supplement to the March 19 issue of RW, incorrectly identified the divisions for the contact persons listed at Westwood One.

The correct divisions are:

*Bob Dunn, EVP/Affiliate Relations, Westwood One Radio Networks, Gordon Peil, Sr. VP/Affiliate Relations (Talk & Sports Programming), Liz Laud, VP/Affiliate Relations (Music & Event Programming)*

## GUEST COMMENTARY

# Power Lines Deserve Great Care

by Cliff Woodman

**BRUNSWICK, Ga.** On Dec. 27, 1996, we had an accident with the telescope mast on our remote vehicle. I thought RW readers should know how severe electrical damages can be.

WXMK had a remote scheduled at a local car dealer from 3 to 7 p.m. The remote vehicle was a '91 Ford Aerostar van, equipped with a 34-foot Will-Burt pneumatic mast, dual Scala yagi antennas and a Marti RPT-30.

The jock on location was setting up the remote as she normally did. She parked the van on the side of the road in front of the dealership and began unloading and setting up equipment.

She plugged in the mast while she was setting up. She completed setting up about the time that the mast reached the top. That's when she began to hear sparks

she realized what had happened.

By this time, the van was becoming engulfed in flames. Sparks were even jumping from the rims to the ground. Once the flames began roaring, the aluminum mast literally blew apart and then it fell out of the power lines.

The firefighters were unable to control the flames until the mast was removed from the power lines. The van and all its equipment were destroyed (approximately \$30,000 in damage). Fortunately, no one was injured in the incident. Georgia Power Co. said that no one in the area lost power during the episode.

This accident has created heightened awareness in setting up remotes now. We have replaced all of the equipment, including the mast (we did get one that was 6 feet shorter). This could be a great

opportunity to let your readers know how serious the damage can be. Fortunately I had enough redundancy in equipment that we didn't miss our next remote at 7 p.m. And we also made up the remote the following day, although we did never with the car dealership that we had been able to draw that kind of a crowd with any other remote before. We even discussed the idea of having a fire sale.

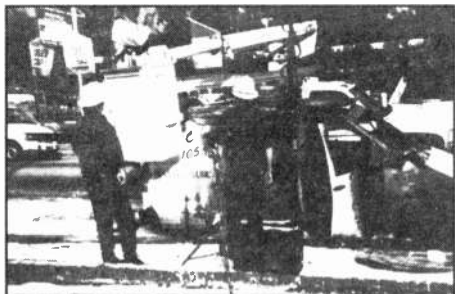
We can joke about it now, but I cannot stress how important it is to take caution when setting up remotes. We are so very lucky that there was no loss of life in this incident. This also proves that redundancy pays off.

■ ■ ■

*Cliff Woodman is chief engineer of WXMK(FM)/WSEG(FM) in Brunswick, Ga. Reach him at (912) 261-1000.*

*Radio broadcasters who use ENG equipment may also wish to visit the Internet website of WAGA-TV Atlanta. Andrew Funk, assistant news operations manager, has compiled "Guidelines for Microwave Electronic News Gathering." The many useful topics include what to do before raising masts, how to deal with thunderstorms, and what to know about lightning from the National Lightning Safety Institute. One topic says it all: "Look Up and Live."*

*Visit <http://www.wagatv.com> /ENG or send Andy e-mail at [kb7uv@wagatv.com](mailto:kb7uv@wagatv.com)*



The Damaged Remote Van

flying. When she walked back over to the van, sparks were popping out of the speaker and mic cables. She didn't realize the mast had extended into a 12 kV power line.

The van was not parked directly under the lines but just to the side of them. The van was not exactly level, and as the mast extended it began leaning more and more. What was only a few inches on the ground turned into a few feet at the top. She thought that the Marti was causing the problem, and reached in and switched the transmitter off. When it didn't stop,

## BUSINESS DIGEST

Report business news to: Radio World  
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**Strategic alliance for WENN and Radio Ventures:** World Entertainment News Network and Radio Ventures Inc., of New York, will jointly produce an audio entertainment news product to be provided on CD to radio stations internationally.

The specially designed bi-weekly service includes a minimum of 40 stories with background information on the stars featured and a script.

Don Eberle, CEO of Radio Ventures says, "Using WENN's global news gathering resources complements our existing network of music reporters throughout the world and we have developed a new entertainment news service which will provide our affiliate stations with everything they need to produce their own, up-to-the-minute music and movie magazine program."

**1996 radio market revenues:** Raleigh, N.C., experienced the biggest growth rate in estimated revenue gains for all Arbitron markets in 1996.

Raleigh experienced a 18.2 percent growth according to BIA's Investing in Radio 1997 Market Report.

Four FM stations owned by SFX Broadcasting accounted for more than 40 percent of the revenue in Raleigh.

Charlotte-Gastonia-Rock Hill, N.C., ranked second at 17.6 percent growth and Portland, Ore., ranked third with a growth rate of 16.5 percent.

Greenville-New Bern-Jacksonville, N.C., New Orleans, San Francisco, Akron, Ohio, Orlando, Fla., Miami-Ft. Lauderdale-Hollywood, Fla., Salt Lake City-Ogden, Utah, and Cincinnati, Ohio rounded out the list of top growth markets.

**Capstar to acquire 20 stations:** Hicks, Muse, Tate & Furst Inc., a private investment firm, and Capstar Broadcasting Partners, a radio investment group, formed by Hicks, Muse and Capstar chairman and CEO, R. Steven Hicks, signed agreements totaling \$60 million, through which Capstar will acquire 20 mid-sized radio stations.

Capstar will acquire assets of four separate radio groups: The Madison Radio Group, of Madison, Wis., Commonwealth Broadcasting of Arizona, L.L.C., Cavalier Communications, L.P., with stations in the Roanoke and Lynchburg, Va., markets and Comco Broadcasting Inc., with stations in Anchorage and Fairbanks, Alaska.

Financial terms of the individual transactions were not disclosed.

**Record quarterly revenue for Evergreen Media:** In addition to record quarterly revenue, Evergreen Media announced record broadcast cash flow for the fourth quarter.

They were the highest quarterly results in company history. For the three months ended Dec. 31, 1996, consolidated net revenues increased 85.8 percent to \$88.7 million from \$47.8 million last year.

Broadcast cash flow (defined as station operating income excluding depreciation,

amortization, and corporate, general and administrative expenses) was \$40.8 million for the fourth quarter of 1996, a 104.8 percent increase over \$19.9 million versus the same period in 1995.

**Caballero Spanish Media to represent SBS stations:** The Interep Caballero Spanish Media will handle Spanish Broadcasting System national advertising sales for the group's stations.

Spanish Broadcasting currently owns nine stations in New York, Los Angeles and Miami, with annual national billings of approximately \$14 million.

The Interep Radio Store is a sales and marketing company solely for radio advertising. It owns and operates CBS Radio Sales, Clear Channel Radio Sales, among others.

**Cox Radio to purchase KRTO(FM):** Cox Radio Inc. signed a letter of intent with El Dorado Communications Inc. to purchase KRTO(FM), Los Angeles, for approximately \$19 million.

In Los Angeles, Cox Radio owns talk-station KFI(AM), adult-contemporary station, KOST(FM) and R&B oldies station, KACE(FM).

Closing of the transaction is subject to the completion of due diligence, negotiation of a definitive asset purchase agreement and regulatory approval.

Upon completion of the acquisition, and several other pending transactions, Cox Radio will be one of the 10 largest radio broadcasting companies in the United States, based on both net revenues and number of stations.

**CBS Expands in San Francisco:** CBS Radio, Entertainment Communications Inc. and Bonneville International Corp. have entered into a three-party exchange. CBS will acquire Entercom's KITS(FM), San Francisco; Bonneville will acquire CBS' KPIX-FM, San Francisco, and Entercom will acquire CBS' KLOU(FM), St. Louis. CBS will now own eight stations in the San Francisco market.

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# EAS: Trial by Wind and Water

by Bob Rusk

**LITTLE ROCK, Ark.** Radio stations had EAS equipment in place, but the system apparently was not much help during the recent killer tornadoes in Arkansas that claimed 25 lives and injured hundreds more.

"I'd like to blow the EAS up," said Tom Rusk, owner of T & M Enterprises, which provides engineering services to several of the highest-rated Little Rock stations.

"We're still in the learning process.

Honestly, we're still trying to figure out what happens when alerts come down," Rusk said.

No alerts were received, though, from the first primary or second primary stations that serve the market, according to Chris Duncan, Rusk's assistant engineer.

"The only alerts we did receive came off the weather radio," said Duncan. "But those alerts were logged as 'alert received.' That's all the information it gave the people."

As a result, there were no EAS messages informing listeners that the tornadoes had hit. T & M performs engineering for KABF(FM), KDDK(FM), KLRE(FM), KMJX(FM), KUAR(FM),

KURB-FM, KVLO-FM, KYTN(FM), KEZQ(AM) and KITA(AM).

"There was nothing," Duncan said. "I'm sure there was audio with the alerts sent by the weather radio. But it was sent as a generic alert, with the message afterwards, which wasn't encoded and sent with the message."

Rusk said he felt EAS would work better on automated, rather than locally operated stations.

"If you set it up to run automatically, in theory it will take care of everything. But when you want to have some control, it won't," Rusk said.

At the root of the problem is the lack of a state plan, said Norm Laramée, chief

engineer at KSYG-FM, the second primary station in Little Rock.

"It's still up in the air," Laramée said. "There's no (EAS) organization in this state. We are developing our own plan; we just don't see the state or anybody else in the area coming forward to make this thing work."

"(During the tornadoes), admittedly everyone in the area got caught." Adding to the problem, Laramée said, is that too few engineers cover the stations in Arkansas, a state where the SBE chapter lacks a chairperson and does not meet regularly.

"We're all so busy trying to keep things working that there is never enough time to attend all the (EAS) meetings. When we have attended, we've had to travel long distances to get there," he said.

See EAS, page 13 ▶

## What's Up With Public Interest

▶ BELTWAY, continued from page 3

Judiciary Subcommittee Chairman Judd Gregg sent a letter to the commissioners asking them to define the role of the Competition Division in license transfers and how the commission's reviews are coordinated with those of the DOJ.

The FCC representatives at the conference defended its policy. Hundt said that it would necessitate "a rush to judgment" if the FCC were to render a review before the DOJ completed its analysis. Competition Bureau Chief John Nakahata described the bureau's analysis as a tool to strengthen the economic analysis of the commission's review. The bureau was formed a few years ago after the FCC had received criticism for inconsistent economic analysis.

### Liquor advertising

What Washington power meeting would be complete without a little booze? This temperate crowd was hearing or seeing nothing of it, however.

Most participants in this debate seem to agree that the expansion of liquor advertising should be limited as much as possible, and prohibited to minors. Members on the Hill differ on how to solve the problem. Republican Tauzin said he wanted the players — broadcasters and the distilled spirits companies — to come up with their own resolution, without government intervention. Moses Boyd, the Senate Commerce Committee staff counsel, expressed concern over Hundt's attempt to use the FCC's licensing and programming authority to assert its jurisdiction in the regulation of liquor ads.

But Democrat Markey wants to work with the NAB to squelch the ads. He warned broadcasters that liquor companies might turn the debate into one about the across-the-board effects of alcohol, which he said wouldn't bode well for beer and wine advertisers.

Boyd said the Commerce Committee's hearings on the issue had been indefinitely postponed.

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World Radio History



# WorldDAB, WorldSpace Wrangle

by Jeff Cohen

**LONDON** While the various proponents of a domestic digital audio broadcasting (DAB) system bicker over which system to adopt as a standard, things on the other side of the Atlantic are heating up as well. Relations between WorldSpace and WorldDAB — formerly EuroDAB — are under strain.

WorldDAB is the proponent of the Eureka-147/DAB system already in widespread use in Europe. WorldSpace, on the other hand, would beam satellite programming to low-cost, multimedia receivers in developing nations.

An article in the EuroDAB Newsletter,

authored by Franc Kozamernik, senior staff member of the organization, has produced controversy. The article is critical of WorldSpace for its technical performance claims and marketing strategy.

The article attacked WorldSpace for using its position as a private enterprise with the ability to attract large amounts of capital to create a proprietary system to be implemented before those using the agreed Eureka-147 standard.

Kozamernik also said WorldSpace is undermining worldwide efforts to create a single terrestrial and satellite DAB standard that would allow listeners to use a single radio for both ground- and space-based broadcasts.

The advisability of the article sparked much private debate within WorldDAB, as WorldSpace is itself a member of the organization. Though Kozamernik called it a "very personal reflection on the WorldSpace phenomena," there is a feeling among some participants that he may have not acted wisely.

WorldSpace has now submitted to the newsletter an article signed by John A. McLaren, director of corporate affairs for the company, that attempts to set the record straight.

It is not a point-by-point rebuttal. The article describes the evolution of the system and how WorldSpace attempted to attain some degree of compatibility with

Eureka-147 DAB, but that on technical grounds it could not accept its limitations in satellite applications. Some new information emerges in the article, including the first predictions of the performance limits of its system.

According to Kozamernik, reception of the WorldSpace system will only be possible when "the antenna of the receiver has a line-of-sight path to the satellite." He went on to argue that it was not possible to serve both car and home radios adequately at the same time and that "the system has no provision for overcoming local screening."

"A considerable proportion of the WorldSpace receivers would be unable to receive satisfactory signals at any one time ... and can one sell a system that provides perhaps only 50-percent availability," he said.

But McLaren countered that by choosing time division multiplex (TDM) QPSK modulation rather than COFDM — the method adopted by Eureka-147 and proposed satellite systems based on Eureka such as MediaStar — a 6.5 dB higher link margin is obtained with the same power available.

"This link margin is important for compensating reasonable blockage such as dry foliage," McLaren said in the WorldSpace rebuttal. Of course with today's technology, it is not possible to obtain enough link margin to overcome heavy blockages such as buildings. However, this type of blockage can be overcome by means of terrestrial gap fillers in urban or very developed areas. WorldSpace is studying both indoor and outdoor retransmission techniques."

Responding to WorldSpace counterarguments, Kozamernik told *RW* he stands by every everything he wrote.

"The 6.5 dB higher link margin is not relevant and will not improve reception of the WorldSpace transmissions; it requires line-of-sight, and if the path is blocked there will be no reception," he said. "I doubt the viability of having gap fillers that will require the radio to have two tuners."

WorldSpace stressed the importance of its mission to bring radio to large numbers of people in the developing world who previously had no access to the medium and said it had to adopt a system that could be implemented now.

According to WorldSpace, this was not possible with Eureka. "WorldSpace will cover an area of approximately 126 million square km with 8.8 dB of link margin. To achieve this same result utilizing COFDM would require a total of nine satellites of the same power," McLaren said.

## Release of L band

In the intense criticism in the original Kozamernik article was a piece of praise for WorldSpace's lobbying for the release of L-band frequencies for direct satellite broadcasting.

But Kozamernik also said that when WorldSpace starts operation in 1998, many nations will not yet have cleared other services from the band. Considerable interference, he said, may result.

Kozamernik said he strongly believes WorldSpace should not be using these valuable frequencies.

"For a line-of-sight system, WorldSpace could use Ku band — 11 to 14 GHz. It will close off the precious L-band to DAB systems that would really gain from its characteristics and offer truly mobile reception and we will also lose the chance to have a global frequency

See DAB, page 13 ►

## Who Knows what lurks in the minds of the creators at SMARTS Broadcast Systems? The Spider Knows!

The Spider spins through the World Wide Web, weaving together business, operational and audio data. It links spot production, logs, billing and many other station operations into a single, cohesive, cost-effective unit.

The Elvis imitator in Memphis produces a spot that airs in LA 20 minutes later! Your morning man can be anywhere on the planet and be on the air for every shift, and be on multiple stations in the group. Your sales department in Peoria shares promotions and ideas with your sales force in Lincoln.

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Telos

# DIRECT CONNECTION

## The Museum of Television & Radio Tunes In Tradition, Turns On Innovation

Here, what's past is indeed prologue

**H**oused in stunning buildings in New York and Los Angeles, The Museum of Television & Radio doesn't just preserve history, it makes it too – with a little help from Telos Systems.

Founded in 1975 by the late William S. Paley, the non-profit institution boasts a collection of 75,000 programs covering more than 75 years of television, radio and advertising.

Designed to serve visitors, researchers, and media from around the world, each facility features galleries, theatres, screening rooms, listening consoles and a state-of-the-art radio studio that integrates a full range of Telos Systems equipment, including digital telephone hybrid interfaces and Zephyr digital audio transceivers that enable broadcasters to send and receive high-quality audio via the global dial-up telephone network.

There are two Zephyr Digital Network Audio Transceivers in New York and one in LA linked to dedicated ISDN lines. Each facility also incorporates Telos ONE Digital Hybrid Telephone Interfaces, ONE-x-Six Talk Show Systems, and desk-top Switch Consoles for control, conferencing and line selection.



David Byrne, lead singer and founder of the rock band Talking Heads, performs during a live broadcast from The Museum of Television & Radio.

The Museum taps its collections as the basis for exhibits, seminars, and a broad range of other educational offerings for all ages. Programs that originate from the theatres and radio studios regularly put the Telos Systems gear through its paces according to Director of Engineering Marty Yoskowitz.

Live University Satellite Seminar Series allow performers, critics, writers, and directors to interact with a theater audience as well as callers from over one hundred participating colleges and universities nationwide.

While the actual seminars are sent via microwave to an uplink, then fed unscrambled over both C and Ku-band, Yoskowitz depends on Zephyr to link the LA and NYC facilities during rigorous technical run-throughs the day of each transmission. "We use Zephyr for rehearsals instead of paying for a full uplink, not just to save money but because Zephyr gives us 15 KHz or better quality audio." Efficiency and reliability are especially important when the likes of the cast and creative team of *Homicide: Life on the Street* discuss how they shape their gritty prime-time drama.

➔ **BACK PAGE**

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# For Voice-Overs the World Over, Zephyr Saves Air Fare

When long wave radio station Atlantic 252 in Trim, Ireland needed a jingle package to fit its tight, on-air sound, the top 40 station turned to Thompson Creative in Dallas, Texas. Phone calls, faxes, DAT tapes crossed the Atlantic in an effort to tailor the spots to everyone's satisfaction. Costs mounted up. But, after several months it appeared that Ireland and America might remain "two countries divided by a common language." That is until Zephyr came to the rescue.

Instead of hopping a plane to Dallas, the Atlantic 252 general manager Henry Ows and program director Al Dunne went to The Farm Studios in Dublin where in just two sessions Zephyr demonstrated how fast and economical high quality, remote production can be using dial-up ISDN lines. Tapping Zephyr's bidirectional capabilities, the client was able to audition the jingles and simultaneously confer with the Thompson Creative producer. At the second session, with the jingle singers poised at the Dallas studio, the client could precisely shape the sound to the station's specifications. Within 45 minutes, 15 cuts were okayed. By the session's end a master was approved, all using Zephyr via ISDN.

"Zephyr lets you concentrate on the talent and the results. It makes distance irrelevant," according to The Farm's managing director Bobby O'Reilly. As the only post production house in Dublin equipped with the Zephyr, O'Reilly reckons he can connect to far more resources on the international scene than his competitors.

Clued in to ISDN's potential early on, O'Reilly was eager to exploit digital dial-up technology as soon as it became available in Ireland. In the summer of 1995, he bought a Zephyr Digital Network Audio Transceiver. The Zephyr was the first device to use ISO/MPEG Layer III coding to provide full stereo bandwidth in a single, integrated transceiver. Soon afterward, when Layer II became available, O'Reilly offered to serve as a beta tester. The Layer II software arrived the morning a major client had booked a session that required a Layer II codec. It was installed with no time to spare for testing. "It worked first time without any problems... which was a major relief," O'Reilly recalled.

O'Reilly credits Zephyr for helping him snag at least half a dozen major clients. He calls the transceiver "a voice-over workhorse" – sending and receiving more than 30 different sessions a week. "With Zephyr it's possible to satisfy any client anywhere in the world on demand."

"With Zephyr it's possible to satisfy any client anywhere in the world on demand."



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- With Layer III, Layer II, G.722, and G.711, Zephyr is the most compatible codec available.
- The ideal solution for remote broadcasts, ad hoc networks, voiceovers, distribution of commercials, backup to satellite and microwave links, and many other applications.
- Designed by Telos specifically for radio applications over ISDN.
- Clean, uncluttered front panel for simple operation. Full metering, call duration timer, headphone jack, and mic/line inputs.
- Built-in input protection limiter. When your talent screams, your audio doesn't distort.
- Zephyr has an integrated ISDN terminal adapter designed for the non-technical operator. You can even place a standard voice-grade call to a Plain Old Telephone Service (POTS) telephone.

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A growing number of radio stations are also getting "Audioactive" to launch great-

sounding Webcasts. Audioactive offers everything needed for a complete Internet audio broadcast chain including encoding systems, a "transmitter" or audio server, and easy-to-obtain receivers or players – client software applications that run on listeners' computers.

Audioactive provides components for content providers, audio Web site developers, Internet Service Providers (ISPs), and client/listeners – with each offering appropriate to the individual application.

Key to the Telos Systems approach is a dedicated hardware-based real-time encoder. A multiple DSP-chip compression engine performs state-of-the-art enhanced MPEG-2 Audio Layer III bitrate reduction, the most powerful audio method endorsed by the competitive MPEG standards process, to ensure superior sound quality.

Audioactive requires PC soundcard and Power Macintosh-equipped Websurfers to download a free Audioactive player (helper application) in order to listen to live Webcasts.

# 100 Delta is KFI Talkers' Brand

Welcome to KFI, the most powerful AM station in the West where a band of maverick talkmeisters rides herd over the airwaves using 100 Delta digital telephone hybrids from Telos Systems to keep callers in line.



The Los Angeles 50,000 Watt Class 1-A clear channel station is home to Dr. Laura Schlessinger, the medium's number-two talker, as well as local talent including morning mouth Bill Handel, feminist Tammy Bruce, and drive-time drovers John Kobylt and Ken Chiampou.

Talk put the seventy-five-year-old station back on the ratings map nearly a decade ago. That programming shift coincided with the introduction of the Telos 10, the first all-digital hybrid, which veteran Chief Engineer Marvin Collins eagerly adopted. "Our analog hybrids could null on one line, but wouldn't hold for the next line," Collins recalls. The Telos 10, with its digital auto-nulling capability and excellent send audio rejection, solved the problem.

When the Telos 100 came out, Collins traded up to take advantage of its "better sound quality." In addition, its feature set was better suited to the station's applications.

A year ago, Collins switched to 100 Deltas to get the benefit of an advance that delivers consistent operation from inconsistent telephone lines – digital dynamic equalization. Now, three rack mounted Telos units work full-time in the main studio. Using a Symmetrix 108<sup>®</sup> that assigns calls to the three 100 Delta hybrids, the talent is able to easily conference in as many as two callers and an

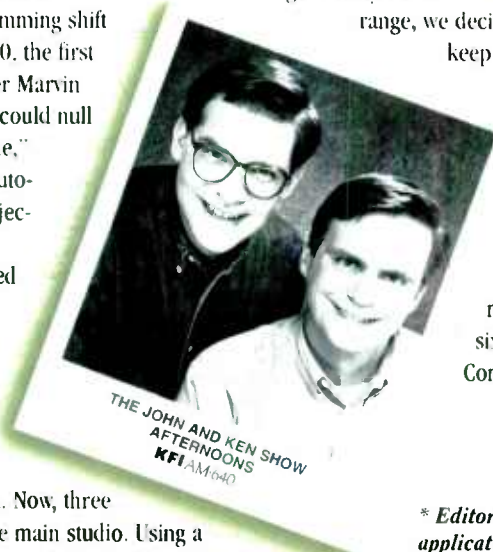
out-of-studio guest on the air.

Collins also likes the hybrids' automatic gain control (AGC), an asset he discovered "by accident" when an outboard compressor he relied on failed so he bypassed it and fed the 100 Deltas straight. "The sound was so good over a greater dynamic

range, we decided to keep it that way."

Operating from her own studio at KFI, Dr Laura also counts on a 100 Delta, combined with a Telos 1A2 Interface Module and Switch Console, to ensure that flawless two-way conversation flows between the no-nonsense therapist and her millions of "patients". Collins says the nationally-syndicated counselor intuitively juggles six lines of incoming calls using the Telos Switch Console to punch up each query.

*\* Editor's note: Consult our web site for a special application note on connecting Telos hybrids to the call director of the discontinued Symmetrix 104 and 108 models.*



Audioactive supports NetShow 1.0, the new streaming media service for Microsoft's Internet Information Server 3.0 (IIS) and Windows NT Server 4.0. NetShow is an open, standards-based software platform for delivering live and on-demand multimedia content over the Internet and corporate intranets.

Audioactive is also fully compatible with Macromedia's Shockwave plug-in and Shockwave audio standard, enabling the millions of Web browsers who use the popular Shockwave to automatically receive live Audioactive broadcasts. Shockwave is free.

Last fall, Apple Computer, Inc. launched its implementation of Audioactive's real-time streaming audio capability for live Macintosh Music Network online concerts.

Telos Systems' current solution for live Internet audio using standard http Web servers employs the following technology components:

- Telos Systems Audioactive hardware encodes audio in real time, harnessing a dedicated, DSP-based hardware platform offering greater processing power than systems that are bound to general purpose CPUs.
- Telos Systems Audioactive replication software supports multiple servers to scale up the number of listeners and improve propagation.
- Telos Systems Audioactive encoding software converts PCM audio files in Apple AIFF, UNIX.au, or Microsoft.wave format and stores them for subsequent downloading or streaming.
- Macromedia's Shockwave or Telos Systems Audioactive client software allows consumers to listen to the live audio content.

## ➔ Museum

From Page 1

During interactive seminars, calls to an 800-line are screened by the Museum's curators in New York, then, depending on the seminar's source, either fed directly to a local ONE-x-Six or sent to LA over POTS (plain old telephone service) lines to a ONE-x-Six where the calls are held and punched up by an engineer on cue from the moderator.

The presenters "do not use IFBs or ear phones," says Yoskowitz. "We pipe caller-audio straight into the theatre's PA." Since the ONE-x-Six accommodates monitoring over open speakers and has automatic gain control (AGC), no one misses a beat.

Previously, Yoskowitz said it was difficult to match levels using a competitor's hybrids, one assigned to each of four incoming lines. "Now one hybrid does it all. The ONE-x-Six interfaces wonderfully with both our house phone and sound systems."

The Telos Systems hybrids and Zephyr transceivers play key roles when top broadcasters like Don Imus, Michael Jackson, Donnie Simpson, and John Gambling originate their shows from either the New York or Los Angeles Museums' Ralph Guild Radio Studios.

Whether transmitting KDKA's 75th anniversary celebration, *The Ashford & Simpson Show* or *The R.E.M. Radio Hour: A conversation with Berry, Buck, Mills and Stipe*,



*John Cale, founding member of the seminal art-rock band The Velvet Underground performing live from The Museum of Television & Radio*

Yoskowitz has found that "Zephyr works with whatever any broadcaster throws at it." That makes everyone's job easier he notes. To send high-quality audio over ISDN, Yoskowitz adds that visiting engineers "love the idea that all they do is dial up the Zephyr and they're connected. Turn it on and forget about it. It's that easy."

*Editor's note: To learn more about The Museum of Television & Radio, visit its World Wide Web site at <http://www.mtr.org/>*

"Zephyr works with whatever any broadcaster throws at it."

Marty Yoskowitz, MT&R Director of Engineering

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*Funk was its own reward when Telos Systems, Capitol Records' New Media division and cross-platform software innovator Macromedia launched the Godfather of Funk into cyberspace for a November Webcast. George Clinton, Live From the Mothership tapped Macromedia's free Shockwave plug-in to give cybernauts live audio, animation and text as well as an online option to buy Clinton's latest album. Shockwave uses Audioactive, the MPEG 2 Layer III real-time audio compression technology developed by Telos Systems.*

### An Audioactive URL Sampler:

- [www.audioactive.com](http://www.audioactive.com) (main site)
- [www.microsoft.com/netshow/](http://www.microsoft.com/netshow/)
- [www.mmn.net](http://www.mmn.net) (Apple Macintosh Music Net)
- [www.macromedia.com/shockwave/epicenter/](http://www.macromedia.com/shockwave/epicenter/)
- [www.wclv.com](http://www.wclv.com)
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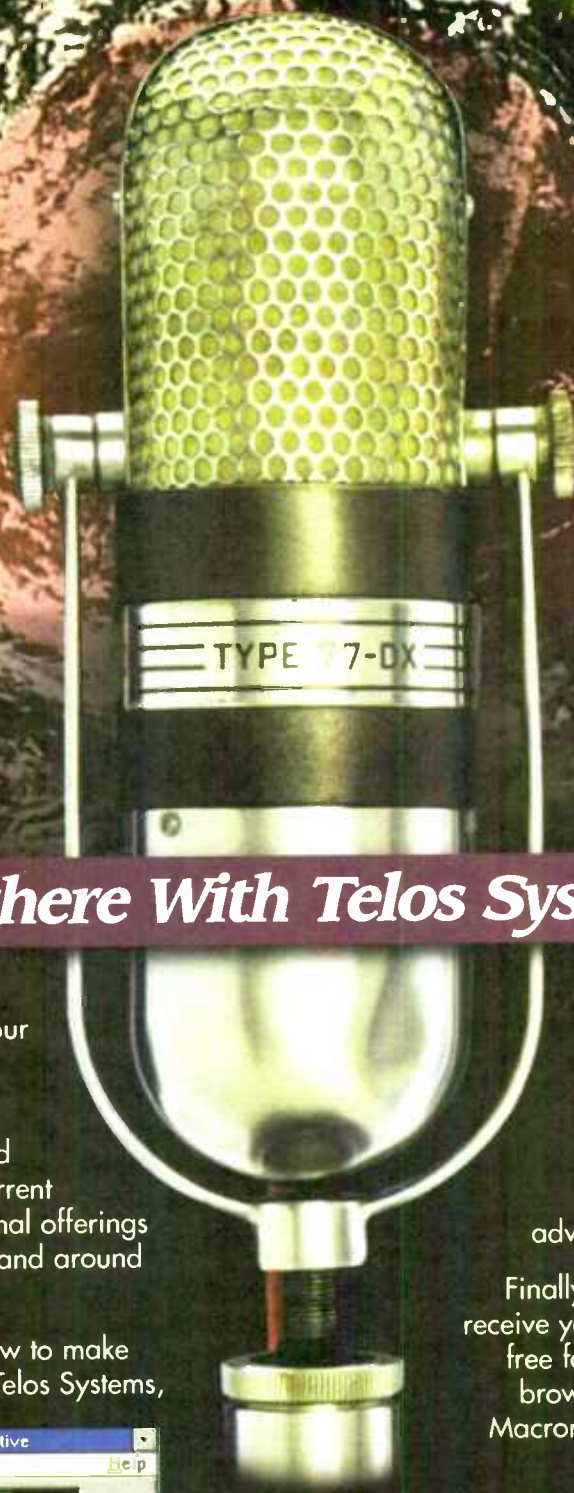


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Circle (6) On Reader Service Card

World Radio History

# ITC Products Are Picked Up

► ITC, continued from page 1

Franklin, Merle Wilson and Andy Rector. The firm built a reputation for tape machines and cartridges throughout the 1970s. In late 1981, 3M bought the entire company from the four founders.

The new owner established the 3M Broadcast and Related Products Division, including ITC and 3M Video, which manufactured video switching products. ITC spent much of the 1980s pursuing the new digital system market. It introduced the High Capacity Digital Audio system and exhibited it at one NAB convention, but the technology never took hold.

Meanwhile, the volume of cart machines sold fell off precipitously. In 1989, 3M decided to close the Broadcast and Related Products Division, and sold ITC to a group of entrepreneurs. Layoffs at 3M in the late 1980s had reduced the number of ITC employees from more than 150 to about 80.

## Late carts

One of the first products ITC released in the early 1990s was the Series 2 Cart Machine, which came at a time when other manufacturers were introducing new digital systems. More than one industry observer who worked with the company said ITC may have failed to recognize and react to the needs of the marketplace.

For a long time, they said, the company lacked direction in how to approach a digital system. ITC eventually signed a licensing agreement with Electronology Inc. to market the DigiCenter. With the demise of ITC, the rights to the DigiCenter remain with Audio Pro Technologies, the distribution arm of Electronology formed three years ago.

"All we did was lose a marketing partner," said Jay Martin, national sales manager for APT and vice president of Electronology Inc. Electronology developed and built the DigiCenter in 1989 and began looking for a marketing partner

**audiopak**

with a good reputation for analog products, one whose managers might be interested in making the transition to digital.

"They were a well-respected, well-known name in the industry," said Martin.

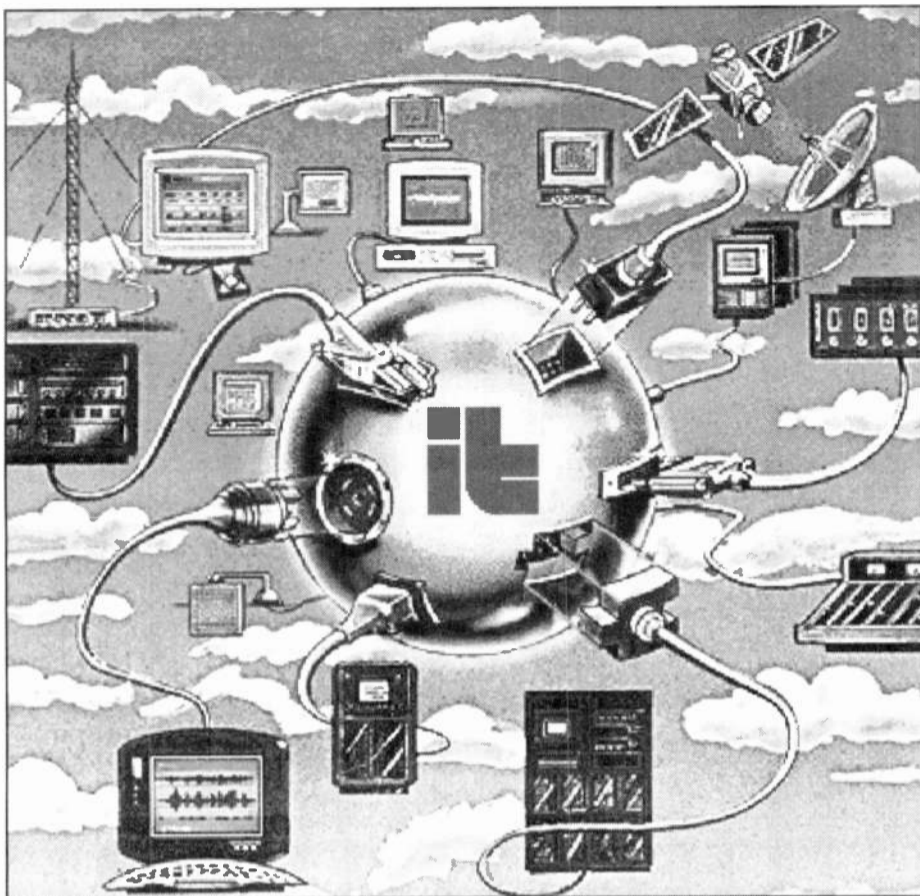
APT recently shipped eight DigiCenter servers to Mexico and one to a station being rebuilt in the Virgin Islands. Martin said engineers have upgraded the platform to operate on a 486/100 MHz server and the workstations to work on Pentium 133 MHz machines. Also, the system will now work on an Ethernet platform instead of the old-fashioned ARCNET.

APT had considered buying all of ITC, but Martin said "too much of it was analog-based." They settled on the ITC Audio Switcher. APT felt enough people would be hurt by its disappearance to assure APT of a market. Disney, ABC and Voice of America are some of the companies that own ITC switchers.

For now, Martin said, it is too early to say what changes APT may make to the product.

"Our goal is just telling people, 'Hey, you don't have a half-million-dollar paperweight,'" he said.

APT is leasing space from SON-O-MAG, maker of one of the original analog automation systems. Martin noted the irony in manufacturing digital automa-



tion products in a building where analog automation products were once made.

## Tape

When the supply of cartridge tape that ITC had bought from 3M began running out, the company began to work with Audiopak to develop a replacement tape. About a year later, in January 1996, the two companies began discussing the possibility of Audiopak taking over the cart assembly work. In March 1996, the cart assembly line was moved to Audiopak in Winchester, Va. The purchase of the tape line was completed that spring. Nick Krassowski of Audiopak has no illusions about the future of carts.

"There's no question it's going to decline," he said. But when Audiopak bought its cart line from Capitol Records in 1988, he was told that carts had a five-year life left. Now he sees another five to 10 years for carts.

## Cart machines

"We will build and service the last cart machines," the old ITC website read. With the age of digital, why invest in a product line that seems destined for extinction? William Musgrave, vice president of DRS Ahead Technology, is extremely optimistic about the purchase of the ITC cart machine line.

"We went into it with our eyes wide open," he said. Ahead originally assumed there would be a 20-percent drop in cart machine sales each year for the next five years. As he talked with people in the industry, however, Musgrave found a bigger market than he expected.

"A lot of people are not comfortable with keypads and a mouse pad," Musgrave said. In his view, there is "sort of an inertia," where people get comfortable with what they are used to. Often, repair to old equipment is more economical than buying new gear, he suggested.

"Because the ITC machine is such high quality, it's worth refurbishing," said Musgrave, who described the cart machine line as the "Cadillac of the industry." To keep that name recognition, Ahead has cre-

ated a new business unit called ITC Cart Machines. In addition to pursuing domestic customers, Ahead plans to market the line abroad, where Musgrave sees a large potential user base. In March, the company announced an agreement with Broadcast Richmond to market the ITC cart machines internationally.

Most important, said Musgrave, Ahead can offer potential customers the assurance of support.

"We will provide support as long as anybody wants to use cart machines," he said. "We see a long-term commitment."

DRS Ahead Technology is a subsidiary of technology giant DRS. The company also owns Mag-Head Engineering Company (MEC), Vikron and Nortronics. At one time, all three supplied tape heads to ITC. In fact, Ahead managers learned that ITC was for sale because ITC owed money to MEC.

To buy all of ITC would have taken Ahead beyond its core line of business, said Musgrave. The company was interested in the tape line, he said, but it was sold to Audiopak. Ahead did purchase the ITC Digital Program Repeater DPR-612, developed in 1992. Musgrave said the

DRS AHEAD TECHNOLOGY INC



company is still exploring the market potential for the unit.

In some casinos, the unit is integrated with slot machines. Disney World owns some units, as do hotels.

Last year, NASA bought three DPR-612s to frighten woodpeckers attacking the nose cone on the space shuttle as the ship sits on the launch pad. The product now plays repeat messages of "something that woodpeckers don't like," said Musgrave.

Anyone interested in ITC products from Ahead Technologies should contact Susan O'Daniel at (309) 828-1381. At NAB '97, the company will share a booth with CMC Technology in the large South Hall (booth 6211) and have its cart machines on display at the Broadcast Richmond Booth (booth 2006) in the Radio/Audio Hall, both in the Las Vegas Convention Center.

For information about DigiCenter or the ITC Audio Switcher, contact Jay Martin of APT at (800) 278-2050.

To order ITC carts, contact Nick Krassowski of Audiopak at (800) 522-2278. The company will exhibit in booth 2010 at the LVCC.

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# FCC Moves Ahead With DARS

► DARS, continued from page 1

in November that it did not believe any of the applicants should be granted a pioneer preference. All three pioneer's preference applicants subsequently withdrew their requests.

Prior to that event, in 1991, and again in 1993, CD Radio applied for permission to begin construction of its satellite. The FCC approved the request in 1995, authorizing the company to spend \$10 million. The approval, however, was quickly followed by hints from FCC Chairman Reed Hundt that the DARS spectrum would probably be auctioned. At that point, while design work continued, CD Radio abandoned plans to start construction work prior to an auction.

## Winners and losers

The April 1 auctions will quickly separate DARS winners from losers. The National Association of Broadcasters believes no matter who gets the two DARS licenses, terrestrial broadcasters will lose.

"Satellite-delivered radio threatens the thousands of community radio stations that provide local news, weather and sports and have made the U.S. system of broadcasting the envy of the world," said an NAB spokesman. DARS applicants unanimously disagree.

"It's nonsense that this is a threat," said Margolese. "Radio is a mass-market service," compared with DARS, which will be niche-oriented.

"That issue is over," said Burnstein, adding that the commission has stated that DARS is in the public interest. "I'm not going to address their concerns. I've had to address those concerns for four years."

Primosphere is the only DARS applicant that intends to offer only advertiser-supported programming. Burnstein predicted three types of listeners will make the expected \$100 investment in a DARS receiver: those who are unhappy with their choices in terrestrial radio; those who live in rural areas who want more choices and those who travel through vast areas with nothing to listen to.

DARS licensees must design a receiver that can accommodate all satellite DARS providers, but DARS receivers do not have to be capable of receiving terrestrial broadcasting formats.

"We really believe that this will be a complement to terrestrial broadcasting," said Caldwell. He said if DARS ends up mirroring existing radio services, it will have failed. DSBC intends to offer a mix of subscription- and advertising-based services. Caldwell said there are huge underserved populations in terms of geography and content.

The FCC report and order cited one study that indicated that 722,102 persons (0.3 percent of the U.S. population) are covered by no FM stations, 2.4 million persons (1.0 percent of the U.S. population) are covered by one or fewer FM stations and 22 million persons (8.9 percent of the U.S. population) are covered by five or fewer FM stations.

Although the NAB criticized the study because it did not include AM radio stations, the commission found that "the record is sufficient to indicate that a significant number of persons in the U.S. receive few high-quality audio signals."

Historically, said Margolese, any

entrenched industry has viewed new services as a threat: television was a threat to radio, video stores were a threat to destroy movies and CNN was going to wipe out local news programs. Assuming there was some competition between a new and existing business, Margolese asked, "Isn't that what life in the United

**We're very happy with whatever public interest requirements they decide.**

— David Margolese  
CD Radio

States of America is all about?"

It will probably take at least three years for the new licensees to even begin rolling out their services and much more time to determine the effect on terrestrial radio.

## Details, details

The report and order addressed many contentious issues. First, the FCC dismissed the assertion by the Consumer Electronics Manufacturers Association that DARS will not work in the S-band (see *RW*, March 5). CEMA had said that the S-band frequencies would require hundreds or thousands of gap fillers and that satellite DARS had "no likelihood for nationwide commercial acceptance."

The FCC was not dissuaded. In the report, it stated: "It has been widely known and discussed in the record that DARS providers will need to rely on terrestrial repeaters and gap fillers. As with all new services, the FCC cannot prove or disprove viability. Only the marketplace can make this determination."

One issue that threatened to hold up a DARS decision even longer was Hundt's contention that the DARS spectrum auctions should be opened to anyone interested in providing the service. In light of the delays already involved with DARS, however, the FCC decided to leave the auctions closed, although both Hundt and Commissioner Susan Ness expressed disappointment with the decision.

Another contentious issue was whether or not DARS should be subscription-based. In July 1995, Commissioner James Quello spoke in favor of making the new service available by subscription. Although three of the applicants plan to use subscriptions to support the service, the report and order did not include such a mandate.

"We find that a requirement that satellite DARS be entirely subscription is unwarranted. Mandating that providers charge for their services is not in the public interest and raises significant legal questions if done for the purpose of economic protectionism as advocated by several commenters," stated the FCC.

Public interest requirements were another hot button. The report and order indicates that at least two of the DARS applicants opposed imposing obligations: DSBC stated that public interest programming obligations were not necessary to ensure diverse public-oriented pro-

gramming, and AMRC was concerned that many of the suggested service rules would not result in better service to the public but would make service impossible.

Caldwell said that most of the proponents had planned to provide public service with or without a mandate.

"We're very happy to have whatever public interest requirements they decide," said Margolese.

Burnstein, whose company will offer advertising-based programming, said he had always envisioned DARS as a radio service "more or less." He said he and his partner own radio stations in California and did not believe public service requirements for DARS would be any less than those for radio.

In the end, the FCC decided that DARS licensees should comply with the same political debate provisions as terrestrial broadcasters. The commissioners also reserved the right to adopt additional public interest programming obligations at a later date.

The commission also sought comments on whether the DARS licensees should have to provide service to areas beyond the continental United States (CONUS), like Alaska, Hawaii, the Virgin Islands and Puerto Rico. Primosphere and CD Radio argued against such a mandate, especially for the first generation of DARS.

In the end, the FCC said the minimum requirement will only be full CONUS coverage, but it strongly encouraged cov-

erage to other U.S. areas and territories.

The new rules give the satellite DARS licensees one year to begin construction of their space stations and four years to launch and begin operating their first satellite. The systems must be operating within six years.

Licensees will be required to file annual reports on the status of their systems. DARS license terms will be eight years and will commence when each satellite is launched and put into operation.

## Today in Running Radio



*"Some agencies don't want to clue their clients into Spanish, and there are some prejudices by the clients."*

Richard Hefel of Hefel Broadcasting Corp. and other leading Hispanic broadcasters talk to *RW* about their challenges and success stories. Learn more on page 61.

There has been a lot of movement within **Arbitron** lately. On the sales side, **Linda Dupree** was promoted from her post as eastern manager. Advertiser/Agency Services, New York to vice president, sales, advertiser/agency services. **Bruce Sipovitz** moved from senior



account executive for Arbitron Radio Station Services to manager, National Radio Sales, Arbitron Radio. **Rob Winston**, former market definition specialist with Arbitron, rejoined the company as a Los Angeles-based Radio Station Services account executive.

Another Arbitron alumnus, **Bill Rose**, returned to the company to assume the position of manager, Market Development and Research Communications.

**Bob Michaels**, previously team leader, Radio Programming, is now manager, Radio Programming Services. **Vicki Murphy** joined Arbitron as a client training specialist; **Debra Goldstein** and **Malou Watterson** were also appointed training specialists.

**Jefferson-Pilot Communications Co.** has appointed **Dan Bowen** program director of CHR WSTR(FM) (Star 94) in Atlanta.

Bowen was transferred from a similar position at KQKS(FM), one of the company's properties in Denver. He replaced **Kevin Peterson**.

**Orban** appointed **Rick Sawyer** to sales manager, North America. He

supervises sales of all product lines through Orban's dealer network in the United States and Canada.

Sawyer has been with Orban since 1995, and previously served as product manager for AirTime, the company's

digital delivery system.

**Broadcast Electronics Inc.** appointed **John O. Morton** to RF customer service engineer.

He is responsible for handling customer service questions relating to Broadcast Electronics RF products, as well as performing on-site field service.

He came to the company from his own contract engineering and consulting firm in Durango, Colo.

**Charles W. "Trey" Bryson** was named digital customer service engineer of the company.

He is responsible for handling calls related to Broadcast Electronics' digital systems, as well as performing on-site installation and training for customers across the country.

**Don Peebles** joined **Solid State Logic** as vice president of broadcast and post-production after more than 7 years in sales at Digidesign/Avid. He is based in the SSL New York office.

He is responsible for continuing the development of SSL's U.S. broadcast and post-production sales and support group, which focuses on Axiom, Aysis, Altimix, Scenaria and OmniMix digital products.



# Bad Weather Tests EAS in California

► EAS, continued from page 7

Michael Clay, a staff engineer at KTHV(TV) and the local EAS coordinator, was surprised to hear that the radio stations did not receive the EAS alerts.

"They didn't?" he replied when contacted by RW. "We did here. We monitor AETN (Arkansas Educational Television Network), which is the local clearing-house." KTHV also has the advantage of an in-house weather department.

Clay acknowledged, however, that "there are problems in the system that need to be ironed out. We need to expedite our next meeting and find out where the problems are."

## Going in with a bang

EAS worked more smoothly in California, where raging waters flooded the Sacramento area. The LP1 station, KFBK(AM), handled 52 EAS warnings in January.

"We broke EAS in with a bang," said Mark Stennett, KFBK chief engineer and Local Emergency Communications Committee chairman.

"We installed the equipment on Dec. 28, and ran a couple of tests. At about 2 p.m. on Jan. 1, the National Weather Service began utilizing the system, issuing warnings to the public about levee breaks and the potential for flooding."

On the radio side, he said, "it was actually somewhat smooth, considering the amount of information that was coming out. We had levees breaking all around us."

"There was an element of confusion in some of the counties regarding authority to issue warnings. We had a couple of conflicting statements out of Yuba County. One branch said, 'Get out now or you'll drown.' The other branch said, 'No. It's too early to do that.'"

The most serious problem occurred when a crawl message — calling for a countywide evacuation — was transmitted on local television. Unfortunately, the hearing-impaired population could not receive the audio content of the message, which only called for evacuation in a small area of one community in the county.

"That caused a lot of panic," Stennett said. "We're working on solving that problem. The way the TV people see it, the ultimate solution would be for the box to read: 'An Urgent Notice Has Been Issued for Sacramento County. Stay Tuned for Further Details.'"

"That would buy the TV stations some time to either manually compile the audio message into a text system or take advantage of the state-run Emergency Data Information Service."

A Sacramento-area EAS after-action critique session was held in February. Tom Hora, public affairs specialist in the FCC Hayward, Calif., office, commented, "The broadcasters deserve a lot of credit for a good job. There were some mistakes — mostly people problems and wrestling with a brand new technology."

Said Stennett, "It's not a perfect fit, but we're committed to making the system work."

# WorldSpace Debate

► DAB, continued from page 8  
plan for the band."

WorldSpace up to now referred to its system as Satellite DAB, but this was attacked by Kozamernik. "Many people may understand the WorldSpace system to be compatible with the Eureka-147 system," he said.

Interestingly, in the two-and-a-half page rebuttal article, WorldSpace no longer uses the term DAB, instead referring to its system as Digital Sound Broadcasting (DSB).

When asked if Kozamernik felt his article was appropriate, especially taking into consideration that WorldSpace is a

full member of WorldDAB, he replied, "WorldSpace is a welcome member of our organization and we have many useful discussions both in the forum and bilaterally."

According to WorldSpace, its purpose is to "meet the market demand for additional radio programs with the most appropriate technology in a manner that is cost-effective for both the listener and the broadcaster."

Broadcasters are particularly sensitive to any controversy surrounding DAB. And the issue of terrestrial-satellite compatibility arises at a time when uncertainty still exists about the pace of development of

DAB, especially when so many major manufacturers have yet to go public with their plans for making receivers.

Some broadcasters, who are members of WorldDAB, also privately voice the fear that WorldSpace will be a problem, whether or not it is successful.

If it does work well and is widely accepted, then there will be the problem of incompatibility with terrestrial DAB and perhaps its whole economic viability.

But if WorldSpace does not perform well enough, there could be a massive loss of confidence in the very concept of direct satellite radio for decades to come.

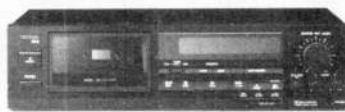
■ ■ ■

Jeff Cohen is the director of World Radio Network and a contributor to RW. Contact him in England at telephone: +44-171-896-9000; or via e-mail at jefc@wrn.org



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# DOJ Makes Ownership of WRFX Difficult for EZ

► GULFSTAR, continued from page 1  
from Gulfstar, and suddenly Justice became interested.

Charles Biggio, senior counsel to the assistant attorney general, Antitrust Division, would not explicitly draw any correlations between the DOJ investigation and Gulfstar's decision to drop the deal.

"Their decision ... to drop the Demaree transaction resulted in our cessation of our investigation. We deem that to be a significant change in their behavior as a consequence of our investigation into the concerns we were expressing to them," he said.

The DOJ expressed concern that Gulfstar's plan to purchase Demaree Media stations KFAY-AM-FM and KKEG(FM) might reduce competition and lead to higher advertising prices in the area. The deal would have given Gulfstar more than 62 percent of the 1995 advertising revenue in the northwest Arkansas market.

"If Gulfstar had acquired the Demaree stations, small businesses in northwest Arkansas would have lost the benefits of competition — lower prices

for their advertising," said Joel I. Klein, acting assistant attorney general in charge of the department's Antitrust Division, and President Clinton's nominee to permanently fill the position.

Gulfstar owns one station in the area — KEZA(FM) — and has entered into an agreement to purchase KKIX(FM) and KKZQ(FM). These stations would give Gulfstar 48 percent of the market.

## Uh, what's a market?

One intriguing aspect here is the DOJ's latest definition of a market. The Gulfstar stations are in Benton and Washington Counties, and the company has assured Justice that it will be notified of any further attempts to acquire stations in the counties.

In other words, in the mind of the DOJ, the relevant market in which competition might be threatened here consists of two counties.

James M. Marsh Jr., an analyst for Prudential Securities and author of "Reports of Radio's Death (at the Hands of the Justice Department) Have Been Greatly Exaggerated," said that he thinks the DOJ might not be examining the right market.

He has been subpoenaed by the department to testify in several antitrust cases, and said he has been told that it is using Arbitron Radio Metros for market definition. (The Fayetteville Radio Metro, into which Washington and Benton counties fall, was ranked 155 in the latest Arbitron report.)

"I tend to think it's hard to carve (markets) up as clean as the Arbitron people would like to," Marsh said, "and obviously when they diced them up, it wasn't for antitrust purposes — it was really just for ratings purposes."

At the National Association of

Broadcasters Radio Group Head Fly-in in February, Klein gave the following, inexact rule-of-thumb: "... our overall market definition requires us to consider geography as well as the relevant product." He said that "metropolitan area" satisfied the geography variable, but things get a little sticky when you get into the realm of "relevant product."

Klein offered a hypothetical example: "... San Francisco and Sacramento can't properly be considered part of a single geographic market simply because there are some San Francisco stations that reach Sacramento. For a supermarket in Sacramento, it wouldn't normally make sense to advertise on a San Francisco station since you're paying to reach a lot of listeners that you don't have any interest in."

Marsh said many of the parameters that the DOJ uses in its competition

analyses are quite nebulous. "At this point it doesn't seem like they're trying to make the process any easier to understand; they like to be operating behind a curtain," he said.

Dollinger of Gulfstar said that even though the deal did not break off as a direct result of the DOJ's investiga-

tion, Gulfstar feels that doing so alleviated the department's concerns.

Biggio of Justice said, "If they were unwilling to commit to us that the transaction was terminated, we would be continuing our investigation."

Marsh said the only way to break this cycle is for a radio group to challenge the Justice Department in court. "You don't set any legal precedent by settling with the DOJ ... You really have to take the DOJ to court to get the legal precedent set," he said.

## Classes and formats

Meanwhile, the DOJ has completed its investigation into Cox Radio's planned acquisition of NewCity Communications.

This purchase would have given Cox a total of five stations in the Syracuse, N.Y., market. The DOJ apparently had a few last-minute queries about the deal, which is expected to close in the first half of 1997, and had issued a civil investigative demand (CID) related to the case. Last month the DOJ gave its seal of approval.

More interesting, however, was the department's handling of the proposed merger of American Radio Systems and EZ Communications.

ARS had to give up KSSJ(FM) in Sacramento, Calif., because the group would have owned six of the 12 Class B FM stations in the Sacramento area. The DOJ called the Class B stations "the strongest, and therefore the most competitively significant, radio broadcasting signals in Sacramento."

The rub here is that KSSJ is not a Class B yet, and the DOJ said that if it is not upgraded by Dec. 31, 1997, then the department has the option to insist that ARS divest another Class B station.

In Charlotte, N.C., the Justice

# Mergers May Bring Unionization

by Sharon Rae

**SAN FRANCISCO** Is radio a prime target for union-organizing activities? According to one labor law specialist, the answer appears to be yes. Michael Lotito, managing partner of the Jackson Lewis San Francisco office, said his firm has seen a huge surge in union-organizing activity over the past year, with a focus on consolidating industries. Radio, he suggested, could be next.

Despite what Lotito called "a very substantial decline" in union-organizing activity over the past 15-20 years, a rededication of sorts at union headquarters is creating fertile ground for a resurgence of union activity.

Lotito said that, as a direct result of this decline, some employers are starting to believe that unions are irrelevant.

## Money talks

"The leadership of the AFL-CIO has put a substantial amount of money into organizing the workforce," said Lotito, citing the recent announcement of a \$30-million-dollar spending blowout to organize the unorganized. "They are attempting to reach out through political activities such as we saw during the November elections ... they're taking credit for displacing 11 of the freshman House Republicans — they spent about \$35 million during the elections to try to regain control of the House."

So is radio ripe for union activity?

One major market news director, who wished to remain anonymous, said changing ownership and large consolidations create an "atmosphere of discombobulation."

"... (W)ith large companies getting bigger and bigger holdings of stations, you are going to have some people at some of those stations who are not used



to the unrest," the news director said. "They'll be upset and fearful for their jobs and livelihood. And that's definitely the right atmosphere for union activities ... In my experience with unions, you are not going to get a lot of benefit with them. Your main benefit is your own ability ... that's your true safety net. If you have a lot of ability, you are going to be held back by a union contract."

Pat O'Donnell, executive director of the Washington/Baltimore American Federation of Television and Radio Artists (AFTRA) local, said 50 percent of the organization's membership in Washington is made up of broadcasters, both in television and radio. She said radio is fertile ground for union-organizing efforts, not only because of consolidations, but also because of the industry's new efforts in outsourcing.

"... (T)hey're trying to contract out to various services like Metro Traffic Control and Metro News and Shadow Traffic," she said.

O'Donnell said to expect more of the same for the coming year.

"AFTRA National has begun an organizing campaign across the country in 1997, not just in radio, but also in cable as well."

O'Donnell said the effort is good news for union shops.

"It will stabilize the marketplace ... so you won't have two out of three radio stations being non-union ... so that the third station that's union is being undercut in the market."

John Krieger is the network coordinator for the National Association of Broadcast Employees and Technicians — Communication Workers of America. He said NABET-CWA is essentially out of the radio business.

At press time, NABET-CWA was negotiating contracts for its members

See UNIONS, page 30 ►

Department forced EZ to divest WRFX-FM. The deal would have given ARS 55 percent of the advertising revenue in Charlotte. WRFX is being swapped to SFX Broadcasting for WDSY-FM in Pittsburgh and \$20 million. ARS will now have 40 percent of the Charlotte market.

## Who holds the gun?

WRFX was purchased by EZ in a deal in which it would acquire Evergreen Media Corp.'s four FMs and AMs in Charlotte. EZ had originally hoped to then swap WRFX to SFX for its country station WTDR(FM) in Statesville, N.C., which, with WSOC-FM, would have given ARS the two highest-billing country stations in Charlotte.

The DOJ felt that this would have made it impossible for advertisers wishing to reach country audiences to buy around ARS, and therefore it would control the country format in the market.

As of early March, Klein had not

specifically stated that the department is looking at "format monopolies," preferring instead to look at the question from the angle of how easy it is to reformat a station in order to compete with a group that is controlling a format.

"Based on what we've seen," he said, "there are good reasons to think that, at least in certain cases, reformatting really isn't likely to happen in response to an anticompetitive merger, much less that such reformatting would necessarily eliminate the competitive problem."

EZ Controller Chris Maguire thought that the Justice Department's concerns were unwarranted.

"Owning a format monopoly has nothing to do with being able to influence your advertisers," he said. "The advertisers still hold the gun."

Broadcasters will have a chance to query Klein themselves. Just weeks before NAB '97, convention planners announced that Klein will speak there (see page 37).

**You really have to take the DOJ to court to get the legal precedent set.**

— James M. Marsh Jr.,  
Prudential Securities

# Views Vary on Radio-TV Ad Sales

by James Careless

**NEW YORK** At a recent PaineWebber Media Conference, Westinghouse Chairman Michael Jordan displayed a table showing his new conglomerate's market share during television and radio prime time. He said, "This shows the importance of radio with television in creating a dominant media strategy." Speculation surfaced immediately about Westinghouse/CBS/Infinity offering cross-promotion advertising packages.

The consolidation of media ownership will no doubt lead to more questions of this kind. Should radio stations try to sell advertising as part of combined radio/TV packages? According to industry observers, the answer is "maybe." Some see advantages, but warned that radio sales run the danger of being overshadowed by radio's bigger brother.

## Selling with TV

Of those willing to discuss this subject publicly, Radio Advertising Bureau President Gary Fries was the most upbeat about the benefits of linking radio and TV ad sales. He described it as a natural trend.

"Many advertisers look upon the usage of a media mix to be the most advantageous way of conveying their message," said Fries. "I do not believe it is something that is a conscious decision ... but I believe when people look at the impressions upon the consumer, ... it's a very logical decision to make, because both media have different types of penetration and reach."

In particular, Fries said, radio is well-placed to overcome the shortcom-

"Radio has been a support medium to television, but with the fragmentation in the television industry, radio today is becoming more a valued stand-alone medium." That's because "radio has targetability. Radio can produce better frequency, and so by packaging radio and television, one could obviate radio's efficiencies."

After all, Ferrel said, the local television market is always adding new and more specialized channels, with more in the wings thanks to the channel-packing abilities of digital video compression.

"It becomes more and more difficult for a television advertiser to efficiently

capture their clientele," he said.

In contrast, the radio spectrum "faces no such technical threat ... Radio is demographically and lifestyle-defined, and as such, is becoming an increasingly efficient medium when weighed against television."

## Buyers beware

These facts are well-known, Ferrel said, and so more people are using radio as a stand-alone medium.

"It's one of the reasons that radio has been valued as it has by Wall Street, and today people can argue more than ever that radio is being used in a more concentrated form because of its tar-

getability."

Hostile to the concept of joint radio-TV ad sales is Ralph Guild, chairman of Interep, one of the largest radio rep houses.

"Radio should be wary of TV's 'wooden horse,'" said Guild. "Radio can stand on its own. We don't need to package radio with another medium unless we are the dominant player."

Dominance in such transactions is important, according to Guild, because "in a recent radio-TV combo, radio has one-third the budget of TV. Why? It was packaged and sold by a predominantly TV rep company."

He said, "Where was TV when radio needed them to compete in the media markets? It's nice to know we're needed, but how much will these new friends cost us?"

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World Radio History

## Radio should be wary of TV's 'wooden horse.'

— Ralph Guild  
Interep

ings of television, when they are used in a joint ad campaign. First among those shortcomings is TV's nature as "a fixed-based medium — I would call an 'appointment medium' — where the consumer has to be available at a specific time to view a specific program. Number two ... unlike radio, there is no real loyalty, from a consumer standpoint, to any given television entity," he said.

"There really is no downside," said Fries. But he warned that "the biggest fallacy ... is a lack of thorough evaluation as to the reach and the point of impact upon the consumer. It needs to be well thought out, and the money needs to be proportionally in the most advantageous place."

## Targetability

Less supportive of the idea of joint radio/TV campaigns is Mike Ferrel, President and CEO of SFX Broadcasting Inc., which has 78 stations in 23 markets.

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The production studio has complete single play-record-edit capability while the on air studio can independently use dual play for on air. While not a redundant system, it does provide a dual studio workstation solution for under \$11,000.

To make the DL3 even more easy to use for air, a 99 button Gemini control panel can be added to the system for only \$1,195. It places hundreds of carts at the jocks fingertips and the files assigned to each button change to support up to 40 different jocks. The Smart\*Record feature of the controller even allows you to record a phoner at the push of a button. The DL3 will automatically trim the front and end of the phoner, and then you just push the button again to play it to air. The Gemini control panel makes the Digilink III workstation fast and easy to learn and use.



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Manhattan, New York



by Matt Spangler

**ANAHEIM, Calif.** With all the hub-bub surrounding NAB '97, one could easily overlook the smaller, but no less noteworthy regional radio shows that are put on across the country.

More than 4,000 Christian broadcasters converged upon southern California this winter for the annual National Religious Broadcasters convention. NRB '97 was a potpourri of contemporary Christian doctrine, politics and broadcast programming and technology.

At the opening general session, NRB chairman Robert Straton welcomed participants and introduced a video statement by Israeli Prime Minister Benjamin Netanyahu, in which he called upon Christian broadcasters to support the peaceful settlement of his country by Israelis and Palestinians.

NRB President E. Brandt Gustavson led the awards ceremony at the opening session. Executive Committee member Sue Bahner bestowed Radio Station of the Year honors on KGBI-FM, a 100,000 W Christian station in Omaha, Neb. The

Radio Program Producer of the Year award went to Promise Keepers for "Promise Keepers This Week," syndicated by Westar Media Group in Colorado Springs, Colo.

One radio personality, one station and one program were honored for 50 consecutive years of service with Milestone awards.

A posthumous Milestone award went to Jack Murray, a Christian evangelist on the air from 1942 to 1993. Other Milestone awards went to David Hofer of KRDU(AM), the first commercial

Christian station in the U.S., and to the "Christian Brotherhood Hour and Viewpoint" program.

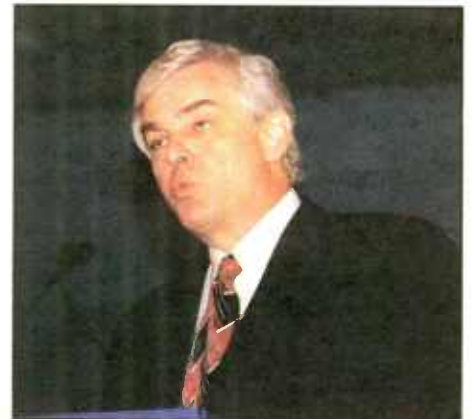
Alive! with Ron Hutchcraft Ministries, out of Wayne, N.J., was deemed Talk Show of the Year. Distinguished Service awards went to Rob Gregory for the "Focus on the Family" program, and to Larry Burkette for his show offering financial tips for Christians.

At the All Media Breakfast, Dr. Bill Bright of the Campus Crusade for Christ ministry, known for the national radio program "World Changes," won the President's award for the JESUS film project.

#### Good cents

Like all broadcasters, Christians can't ignore their budgets. One panel explored alternatives to "Sharathons" to help stations fund their bottom lines.

Panelists suggested a plethora of funding avenues, including renting space in a station's building, retail and wholesale merchandising of products associated with a station's programming, multilevel marketing, music sales, website advertising, listener guide advertising, business underwriting, tower space rental (especially to



Dr. David Jeremiah

PCS providers) and concerts and raffles. One panelist cautioned attendees to be sensitive to FCC guidelines and what is legal based on a station's tax status.

FCC compliance was the centerpiece of "The Seven Most Common Legal Problems in a Radio Station," a session targeted at Hispanic broadcasters. Jim Zoulek, director of the FCC Compliance & Information Bureau district office in Los Angeles, told attendees about the call center at the commission's Gettysburg, Pa. office.

This center answers compliance inquiries. Zoulek also discussed the FCC's Alternative Broadcast Inspection Program, which allows stations to be inspected by representatives from state broadcasting associations, SBE chapters or other such entities.

Above all, stressed moderator Janet Luttrell, manager of WBMJ(AM) in San Juan, P.R., stations should have good legal advice on matters such as reporting taxes for an NPO.

#### Getting along

Religious broadcasters face familiar obstacles, including disputes between competing Christian stations. Attendees

See NRB, page 21 ▶

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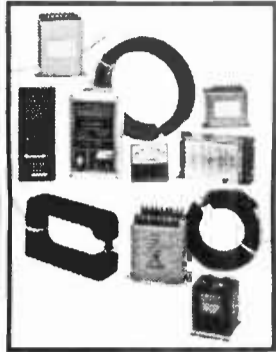
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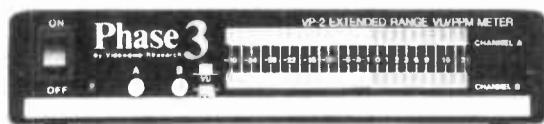
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# Bull Session With Conrad Burns

**WASHINGTON** When RW met with Sen. Conrad Burns, R-Mont., he had buffalo on his mind.

He was not thinking about the town in upstate New York, but the wild North American mammal. Sen. Burns had just come from a press conference about the slaughtering of bison in Yellowstone Park.

That he was able to go from talking bull to tackling the myriad issues facing broadcasters is no great surprise. A member of five Senate Committees — Appropriations, Commerce, Energy, Small Business and Aging — must be able to move readily among unrelated topics.

It also helps that Burns is a bit of a Renaissance man: Before election to the Senate in 1989, Burns had been an auctioneer, football referee, livestock fieldman, U.S. Marine, county commissioner and broadcaster. His grandest passion appears to be for radio; he said he hopes to return to it after his political career.

The outspoken Republican chairman of the Commerce Subcommittee on Communications wants the FCC to keep itself out of liquor advertising and market power analyses in radio industry mergers and acquisitions.

He is not shy about stating himself on these subjects, either. He has strong words for FCC Chairman Reed Hundt, who he said "has a habit of straying off every now and then and writing his own rules and regulations." The FCC, he said, is "setting up their own little bureaucracy within a bureaucracy," rather than defer to the Justice Department on broadcast anti-trust matters.

Looking ahead, Burns anticipates lively debate over foreign ownership of broadcast properties.

"Before our people in the U.S. can invest in broadcast properties offshore, I think we're going to have to allow some foreign ownership in the U.S. It's just not a one-way street."

He flatly opposes the provision of the McCain-Feingold bill that candidates be given free airtime in order to reduce campaign expenses: "Is the rest of the media going to give their time or space away? These people are in business, they provide a service, they get paid for the service."

Burns met with RW Associate Editor for News Matt Spangler.

*RW: You were a reporter for a Billings TV station, and from 1975 to 1986 you had an interest in Montana and Wyoming's Northern Agricultural Network, which grew from being on four radio stations to 31 radio and six TV stations. How has your experience as a broadcaster shaped your view of broadcasting today?*

**BURNS:** I could have never gotten started in the network business had there not been some competition for an alternative way to deliver my programming directly to radio stations.

Back in those days there was a thing called Western Microwave, but I couldn't get on it for the simple reason that the same owner that owned Western Microwave owned the cable systems, owned some big radio stations, also owned a thing called the Intermountain Network, which had an extensive farm program, and I would have been in

competition with them. They were basically a common carrier. I never could get an appointment with them. The office was always closed, so I just had to go to the telephone company and say, "How much for a full-period line to these cities?" When I got a city down in Wyoming, the rate went down, and that's how I got started.

I think it shaped me not necessarily in the broadcast business, but also in that there has to be competition in the marketplace, there has to be alternatives for people who are looking for job opportunities or business opportunities.

*RW: How do you feel about the structure of radio today compared to then? Here we are a year after the passage of the Telecom Act, a year in which 2,100 stations changed hands for a sum of \$15 billion.*

**BURNS:** Back then, you had ownership problems. Now we've relaxed that somewhat, especially in the bigger markets, where you can own up to eight stations. I think that's good. I think it's caused quite a lot of commercial activity in the market.

I'm a little bit concerned that the Justice Department has looked at that as advertising within a market to itself. When radio has to compete for advertising dollars, they have to compete with the local newspaper, with the television people, with the cable people, with the direct mail people; it doesn't make any difference: advertising is advertising.

If you've got a specific audience, or a general audience, you're always going to be in competition, either with the newspaper or other electronic means of advertising. I'm concerned about that. I think when you look at radio being 7 percent of

**... I hope when I'm done in this 13-square-mile, logic-free environment called Washington, D.C., I can go back to radio.**

— Sen. Conrad Burns

the total amount of advertising dollars spent in this country, that is not a huge amount to be concerned about as far as the overall picture of monopolizing the market.

*RW: In general, how do you feel about the final version of the Telecommunications Act and the impact it has had?*

**BURNS:** I feel very good about the act. I think what we have to do now, especially in my subcommittee, is be very sensitive to the rulemaking situation, and make sure that the FCC, in that rulemaking process, follows the intent of Congress. Mr. Hundt has a habit of straying off

every now and then and writing his own rules and regulations.

I think some of things they've done down there as compared to the Department of Justice are redundant, or they're setting up their own little bureau-

cracy within a bureaucracy. When you take a look at any ownership, the Department of Justice deals with antitrust, not the FCC. The FCC deals with the allotment of spectrum and to make sure that those folks that are on that highway stay in their lane.

*RW: Reed Hundt recently suggested that the commission must conduct its own competition analysis in the course of its public interest review. How*

*do you respond to this?*

**BURNS:** I think what he has to supply, if he has any questions about antitrust, is information to the Department of Justice, let them take a look at it, and then if Justice says there's no problem here, then he grants a license. I don't like the redundancy; I don't think it's up to him to set the rules on market dominance.

*RW: Do you have a problem with the FCC holding up transfers of licenses to wait on the Department of Justice's analyses?*

**BURNS:** Sure I do. It has cost thousands and thousands and thousands of dollars, and there's no sense in it.

*RW: Will we see future legislation further loosening ownership caps?*

**BURNS:** Not right now. I think there's going to be quite a debate when we start doing oversight as far as foreign ownership — I think Reed Hundt doesn't like foreign ownership at all — and how that fits with the WTO and all that.

Before our people in the U.S. can invest in broadcast properties offshore, I think we're going to have to allow some foreign ownership in the U.S. It's just not a one-way street.

*RW: What are your thoughts on the transfer to digital radio?*

**BURNS:** Radio is a lot easier (to transfer than digital television). My old network is all-digital now.

Taylor Brown, who bought the network from me when I went into politics, has digitized his whole operation. That network doesn't look anything like it did when I sold it to him.

I think these regional networks are a real story in radio broadcasting, especially in farm broadcasting.

I don't care how you look at it — you can do a whole bunch of polls — if you go through the Midwest, wherever you have a farm broadcaster, his credibility is very high.

He doesn't read hard copy, he's not a sportscaster, he doesn't read hard news — he just does what he does because he knows a lot about it and his love for the

people that listen. Therefore they attract — because farm broadcasters have a habit of visiting with you — an urban audience very quickly, because it's easy listening.

*RW: How have your responsibilities changed, going from Communications Subcommittee member to chairman?*

**BURNS:** It's been pretty good. I've always been pretty active on this subcommittee. We're still very responsive to the other side and its ranking members and everybody on the committee.

I think you have to be that way. I've been very happy. It's a lot nicer being the majority leader than the minority, but I was afforded a lot of courtesies too when I was on the minority side.

*RW: You have said that you hope that broadcasters and the distilled spirits companies can work out the dispute over the broadcasting of hard liquor advertising without the intervention of either the FCC or the FTC. How do you propose they resolve the issue?*

**BURNS:** I think you just have to narrow the scope and say this is a little thing that's going on between the broadcasters and the advertisers.

There's always been a code in the radio and the television business that there are some things you don't advertise. I would hope that they would take a look at that and do the responsible thing.

*RW: What will Congress do if they are unable to reach a satisfactory settlement?*

**BURNS:** Then we will probably respond to the general public.

*RW: Meaning?*

**BURNS:** If we hear that they don't like that, they don't want to subject their young people to that kind of advertising, then I think we'll have to sit down and have another visit again, and resolve it. I would hope, outside the boundaries of the government, but understanding that maybe government intervention one way or the other may take place if they don't work it out themselves.

I like to give the industry and the advertisers the benefit of the doubt. If they can do their business and still hold themselves in a high esteem with the public, then that's their decision, not a government one.

*RW: Will beer and wine advertising be brought into the fray?*

**BURNS:** I don't see why it should. I'd like to keep that scope between the distillers and the broadcasters.

*RW: How would you assess the Clinton Administration's telecommunications policy?*

**BURNS:** I didn't think that they had any policy until we finally passed a reform bill, and then they claimed it was theirs. That's pretty easy to do: "We'll find something that's very popular and we'll pick it up." The president proved that last year in the campaign. I don't think they have any kind of agenda as far as communications is concerned ... Their agenda has been hardly noticeable.

*RW: What about the commission that Vice President Gore has set up to deal with broadcasting issues?*

**BURNS:** When you set up commissions, that's a good way of saying we need another study.

See BURNS, page 21 ►



► BURNS, continued from page 20

**RW:** What do you think they want to study?

**BURNS:** Why I don't know. It's a nice way of saying: "I've got a commission around me, and this is what my commission recommended."

**RW:** What should broadcasters do to fulfill their public service obligations?

**BURNS:** I think they do public service and public broadcast because the public likes it. They have an obligation to that. Whether it's a mandated obligation — I would probably argue with that. We got away from the old rules. I was happy they did that. The programming is much better when it responds to the public rather than the government.

**RW:** What do you think about replacing the comparative proceedings process with spectrum auctions?

**BURNS:** Spectrum auctions I support in some areas. When we talk about the conversion of HDTV, that's where I'm going to pull back a little bit, because I don't think you can ask those folks to go through a conversion and not provide them the spectrum.

**RW:** As you well know, the president asked for \$36.1 billion to be collected from auctions over a five-year period. How do you feel about the concept of spectrum auctions as a band-aid for a bloated deficit?

**BURNS:** I think we've sold it two or three times. We shouldn't put it in the budget. It shouldn't be there. But if it raises so many dollars, then apply it to the national debt or the deficit and let's go on down the road.

But nobody knows what this spectrum is worth — how does he know it's worth \$36 billion over the next five years? In the first place, I don't regard it as a natural resource owned by the American people; I think it's a technology. The American people didn't build the transmitter, and they didn't build the box on the other end of it.

**RW:** What's going to happen if this money isn't raised? We've heard talk of a "trigger tax" being applied to broadcasters.

**BURNS:** We'll cross that bridge when we come to it.

**RW:** What are your thoughts on the McCain-Feingold bill proposal that politicians should be given free airtime in order to reduce campaign expenses?

**BURNS:** Opposed. Is the rest of the media going to give their time or space away? These people are in business, they provide a service, they get paid for the service.

**RW:** This interview will come out during the NAB's annual convention in Las Vegas. Do you have any message for the broadcasters out there?

**BURNS:** I think they provide one of the greatest public services there is in the community — they do the weather, the high school sports, all the things that nobody else wants to do, they do it.

And they do a darn good job of it, and we can't get along without them. I still think radio is a great medium, it's a fun medium and I hope when I'm all done in this 13-square-mile, logic-free environment called Washington, D.C., I can go back to radio.

## NRB Attendees Shop, Talk and Strategize

► NRB, continued from page 18

divulged personal experiences with conflict resolution. Moderator Dennis Rainey of the Campus Crusade for Christ Ministry said fierce competition in the business world often carries over to Christian radio markets.

Ron Harris, general manager of KCBI(FM) in Dallas, referred to an **RW** interview with L. Lowry Mays of Clear Channel Communications (Sept. 18, 1996). Mays had said, "We're in the business of selling Fords or toothpaste or tamales or whatever our customers want to move."

Harris said this environment is an extension of the secular radio marketplace, which shifted from a community-oriented marketplace to one beholden to advertisers and shareholders.

Rainey suggested that Christian broadcasters should form an alliance similar to "the holy clubs of old" and craft a set of standards for broadcast material and for conflict resolution.

At the All Media Breakfast, Dr. David Jeremiah, host of Christian radio's "Turning Point," also spoke of the relationship between the changing world of broadcasting and traditional values.

He urged broadcasters to emphasize interpersonal relationships, especially in this time of technologies that keep people "at arm's length."

The third annual NRB Breakfast will be held April 9 at the NAB show in Las Vegas, and will feature talk show host and former presidential candidate Alan Keyes.

The second Public Policy conference will be held May 7-9 in Washington. NRB '98 will be Jan. 31-Feb. 3 in Washington.



NRB President Brandt Gustavson (far left) and Chairman Bob Straton (far right) with Promise Keepers' Rick Quintana, Steve Chavis and Kevin Skattum (l-r); NRB '97 also featured an exhibit hall.

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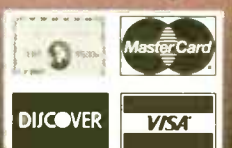
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# Before EBS and EAS, There Was Conelrad

**Ronald Pasha**

Do you still use an AM receiver labeled with odd little triangles like ▼, or the letters "CD" at 640 and 1240 kHz? There's an anachronistic reason for those symbols. It's called "Conelrad."

You may have run across references to Conelrad recently in *RW's* coverage of the new Emergency Alert System. Younger readers may never have heard of it.

Conelrad preceded not only the EAS, but also the just-defunct Emergency Broadcast System.

It was intended to thwart enemy aircraft and missiles from using broadcast signals to locate domestic targets. The name is derived from *Control of Electromagnetic Radiation*.

The inverted triangle simulated the Civil Defense symbol, alerting listeners to tune to these frequencies for emergency information at the height of the Cold War.

In tests as well as actual emergencies, primary Conelrad stations transmitted a 1 kHz tone preceded by two short carrier interrupts to alert all other radio and television stations.

The primitive monitor receivers then in use remained muted until detection of that loss of carrier followed by the tone. Manufacturers offered AM receivers triggered by a combination of carrier drop and tone, but many small stations depended on home-rigged radios sensitive only to carrier loss.

## Only two frequencies

During an alert, primary and secondary AM EBS stations remained on the air, on 640 or 1240, while other stations signed off. Any primary and secondary station not on one of those frequencies shifted to the nearest. (What did a station on 940 do?) I was working at a 1 kW station with a "Conelrad-ready" Gates transmitter. Push a button to switch in a second oscillator and second final tuning circuit. We switched from 690 to 640 kHz. Worked great, except that the station had made no provision for retuning the antenna. With an unmatched load, those 833 tube plates glowed very hot! I don't know what our actual radiated power was, but it was certainly far below our normal 1kW.

EAS is relatively unintrusive. Conelrad involved a national half-hour test about three decades ago. All broadcast stations were to participate. Primary and secondary stations were to remain on the air on 640 and 1240; others were to sign off for 30 minutes. In the then-remote wilderness of northern Arizona, lacking a receivable source of the special programming, we just made the preliminary explanatory announcement, switched to 640, and sat silent for half an hour while the 833s heated the transmitter shack.

Remember the Conelrad telephone? It was a special instrument without a dial, often colored an appropriate red. It sat at the "transmitter control point," i.e. the control board. When it rang, you listened. The military personnel at the other end announced a monotone test, expecting the challenge word to be followed by a response from the operator on duty, the

DJ. Each day had its own word, similar to the system under EBS. You pulled out the classified document, looked up the word for the day, and read it back. Hang up. It's over.

An Arkansas secondary EBS station at which I worked had no special telephone, perhaps because the military base was local and the personnel there called on the station's regular telephone. One call arrived while I was doing a telephone call-in talk show, and the whole sequence went out on the air!

That word list arrived monthly, not See CONELRAD, page 24 ▶



Photo by Alan R. Peterson

It Doesn't Mean 'Compact Disc': Conelrad CD Position at 1240 kHz

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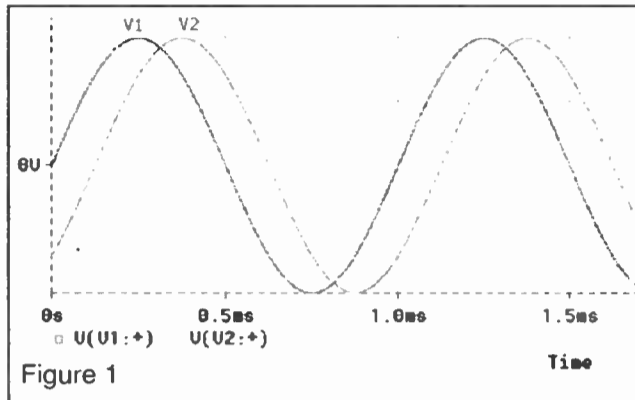
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## CIRCUIT THEORY

# Analyzing AC Voltage Sources

Harold Hallikainen

Thus far in this series, we have looked at various analysis techniques including Ohm's law, Kirchoff's laws, Thevenin equivalents, and Norton equivalents, and their application to DC circuits. We have also determined the instantaneous, average and RMS voltages for a sine wave.



Let's now apply the analysis techniques to circuits with sinusoidal AC voltage sources (which we shall just call AC voltage sources).

## Necessary terms

With direct current, we were concerned with sign (direction) and magnitude. With alternating current, we shall concern ourselves with phase and magnitude. We will measure phase in degrees and magnitude in the appropriate units (volts, amps, ohms, etc.).

Let us define a voltage source as being  $1\angle 0$  and another as  $1\angle -45$ . While each is 1 volt, the second voltage lags, or occurs later than, the first voltage by 45 degrees. If both signals are 1 kHz, the period of the signal is 1 ms (the period is calculated as  $1/f$ , so in this case, it is  $1/1 \times 10^3$ , or  $1/1e3$ ). The phase is how many 360ths of the period one waveform leads or lags the other. In this example, the second voltage source lags the first by  $(45/360) \times 1\text{ms} = 125\mu\text{s}$ .

Figure 1 shows the resulting wave-

forms as viewed on an oscilloscope or using the circuit simulation program pSpice (available from MicroSim at <http://www.microsim.com>). Note that the negative sign in the phase of the source indicates that the signal lags the reference waveform, while a positive sign in the phase of a source indicates the signal leads the reference waveform.

## Impedance

Impedance is similar to resistance except that impedance includes real and imaginary parts if using rectangular coordinates or a magnitude and a phase if using polar coordinates.

Looking first at rectangular coordinates, we find that  $Z=R+jX$  where  $Z$  is the impedance,  $R$  is the real part of the impedance, which corresponds to resistance,  $j$  is the square root of  $-1$ , and  $X$  is the imaginary part of the impedance, which corresponds to reactance.

Mathematicians use  $i$  (imaginary) to represent the square root of  $-1$ . In electronics, we use  $j$  to represent current (probably originally "electric intensity"), so we jumped up the alphabet to use  $j$ .

Figure 2 shows a resistance and a reactance in series. The total impedance of this series circuit is  $R+jX$ .

The impedance of an inductor is  $ZL=sL$ , where  $ZL$  is the impedance,  $s$  is the complex frequency of the signal driving the circuit, and  $L$  is the inductance measured in Henries. For a continuous sine wave, the complex frequency is  $j\omega$  where  $\omega$  (omega) is the frequency in radians per second.

Since there are  $2\pi$  radians in one cycle, the complex frequency can also be expressed as  $j \times 2\pi \times f$ , where  $f$  is the frequency in Hz.

Putting it all together, we find that

$ZL=j \times 2\pi \times f \times L$ . This impedance is purely imaginary, since there is no real part.

An equivalent expression for  $ZL$  would be  $0+j \times 2\pi \times f \times L$  where  $0$  is the real part and  $2\pi \times f \times L$  is the imaginary part. This imaginary part is the reactance of an inductor.  $XL=2\pi \times f \times L$ .

## Component impedances

Component	Rectangular	Polar
Resistor	$R+j0$	$R/0$
Inductor	$0+jXL$	$XL/90$
Capacitor	$0-jXC$	$XC/-90$

Table 1

The impedance of a capacitor is  $ZC=1/sC$ , where  $ZC$  is the impedance,  $s$  is the complex frequency, and  $C$  is the capacitance measured in Farads.

Substituting for  $s$ , as above, we get  $ZC=1/(j \times 2\pi \times f \times C)$ . If we multiply this expression by the number one in the form of  $j/j$ , we get  $ZC=j/(j^2 \times 2\pi \times f \times C)$ .

Since  $j$  is the square root of  $-1$ ,  $j^2=-1$ . Substituting and moving the  $-1$  to the numerator, we find  $ZC=-j/(2\pi \times f \times C)$ . If we define the reactance of the capacitor to be  $XC=1/(2\pi \times f \times C)$ , then  $ZC=0-jXC$ .

Generalizing, we may define an impedance in rectangular coordinates as  $Z=R+jX$ , where  $R$  is the resistance and  $X$  is the reactance, with the understanding that inductive reactance is positive and capacitive reactance is negative.

Figure 3 shows the addition of resistive and reactive components in a complex impedance. We "go out" so many  $R$  units, then "up" so many  $X$  units to arrive at the point representing the impedance.

One of my students once explained that the  $j$  in the impedance expression stands for "jump." He reasoned that we "go out"  $R$  units, then "jump up" (or down, if negative)  $X$  units. It works!

In Figure 3 we see that, besides taking the rectangular route of going out  $R$  and up  $X$ , we could take the more direct polar

See CIRCUIT, page 27 ►

# Conelrad Came First

► CONELRAD, continued from page 23

Do you still use an AM receiver labeled with odd little triangles like ▼, or the letters "CD" at 640 and 1240 kHz? There's an anachronistic reason for those symbols. It's called "Conelrad."

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The inverted triangle simulated the Civil Defense symbol, alerting listeners to tune to these frequencies for emergency information at the height of the Cold War.

In tests as well as actual emergencies, primary Conelrad stations transmitted a 1 kHz tone preceded by two short carrier interrupts to alert all other radio and television stations.

The primitive monitor receivers then in use remained muted until detection of that loss of carrier followed by the tone. Manufacturers offered AM receivers triggered by a combination of carrier drop and tone, but many small stations depended on home-rigged radios sensitive only to carrier loss.

## Only two frequencies

During an alert, primary and secondary AM EBS stations remained on the air, on 640 or 1240, while other stations signed off. Any primary and secondary station not on one of those frequencies shifted to the nearest. (What did a station on 940 do?) I was working at a 1 kW station with a "Conelrad-ready" Gates transmitter. Push a button to switch in a second oscillator and second final tuning circuit. We switched from 690 to 640 kHz. Worked great, except that the station had made no provision for retuning the antenna. With an unmatched load, those 833 tube plates glowed very hot! I don't know what our actual radiated power was, but it was certainly far below our normal 1kW.

EAS is relatively unintrusive. Conelrad involved a national half-hour test about three decades ago. All broadcast stations were to participate. Primary and secondary stations were to remain on the air on 640 and 1240; others were to sign off for 30 minutes. In the then-remote wilderness of northern Arizona, lacking a receivable source of the special programming, we just made the preliminary explanatory announcement, switched to 640, and sat silent for half an hour while the 833s heated the transmitter

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# U.N. Radio Looks Forward Under Annan

**Christopher Boswell**

With Secretary-General Kofi Annan poised to take the United Nations into the next millennium, United Nations Radio is joining in the atmosphere of reform by expanding its program distribution activities and aligning itself with current technological trends.

According to a U.N. public relations representative, the coming years will exemplify a new order for broadcasting for the international body.

**Alternative distribution**

During the 1980s, U.N. Radio relied heavily upon Voice of America (VOA) shortwave transmitters to distribute its programs. But believing that shortwave now reaches an ever-smaller audience, the U.N. is looking to alternative distribution methods.

**The U.N. is in the process of installing a Sonic Solutions digital editing system that will network together the seven studios.**

Programs are now available from the organization on cassette, and distribution of programs on CDs is also being considered.

U.N. Radio programs are produced at the seven radio studios located in U.N. headquarters in New York.

Analog equipment and quarter-inch tape has traditionally been used to assemble U.N.

Radio programs, but the organization is in the process of installing a Sonic Solutions digital editing system that will network together the seven studios and the various programs of the U.N.

Because U.N. Radio is not the average broadcast organization, some modifications to the Sonic Solutions software and interface had to be arranged to meet specific U.N. needs, but the system is expected to be fully operational soon.

**Updates for radio**

In addition to the production of U.N. Radio programs, the studios handle a telephone newsfeed service, conduct ISDN and satellite transmissions, and record meetings of the General Assembly and other organizational conferences.

The reforms initiated by Annan have allowed for an expansion of the United Nations Radio Information System, a telephone newsfeed that allows radio stations to obtain up-to-date news bulletins on major U.N. activities easily. Broadcasters can use these bulletins as they are, or cull for soundbites for local news programs.

The 3- to 5-minute programs are updated throughout the day, and French, Spanish and English language programs are offered.

Touch-Tone (DTMF) signals allow the caller to select among the language and

bulletin options.

Weekly news magazines, as well as peace-keeping reports, daily press briefings, location reports and special features, are available from the U.N. Radio Information System. According to a U.N. spokesperson, the system is accessed 2,500 to 3,000 times *per day*.

**English to Urdu**

On cassette, the U.N. provides 29 programs in 15 languages to more than 180 countries and territories around the world.

The programs range from 15-minute weekly news programs about developments at the United Nations, to 30-

minute special features on the status of women and global issues. Available programs include focuses on Asia, Africa, Eastern Europe and the Caribbean.

The majority of programs are produced in English, but Arabic, Bengali, Chinese, Creole, Dutch, French, Hindi, Indonesian, Kiswahili, Portuguese, Russian, Spanish, Turkish and Urdu programs are also available.

U.N. Radio has also experimented with the Internet to distribute its programs in collaboration with World Radio Network (WRN).

However, following an upgrade to WRN's Internet services, the U.N. is still considering whether Internet-based dis-

tribution of its programs will be included in its radio service's plans.

Transcripts of the weekly program "World in Review" are available on the United Nation's World Wide Web site, <http://www.un.org/Depts/AV/radionews.html>



*The U.N. telephone newsfeed is accessible from Touch-Tone telephones at (212) 936-3777. For information on other U.N. programs, contact the U.N. Department of Public Information via fax (212) 963-6869; or e-mail: [audiovisual@un.org](mailto:audiovisual@un.org)*

*Christopher Boswell is a freelance writer based in New York City.*

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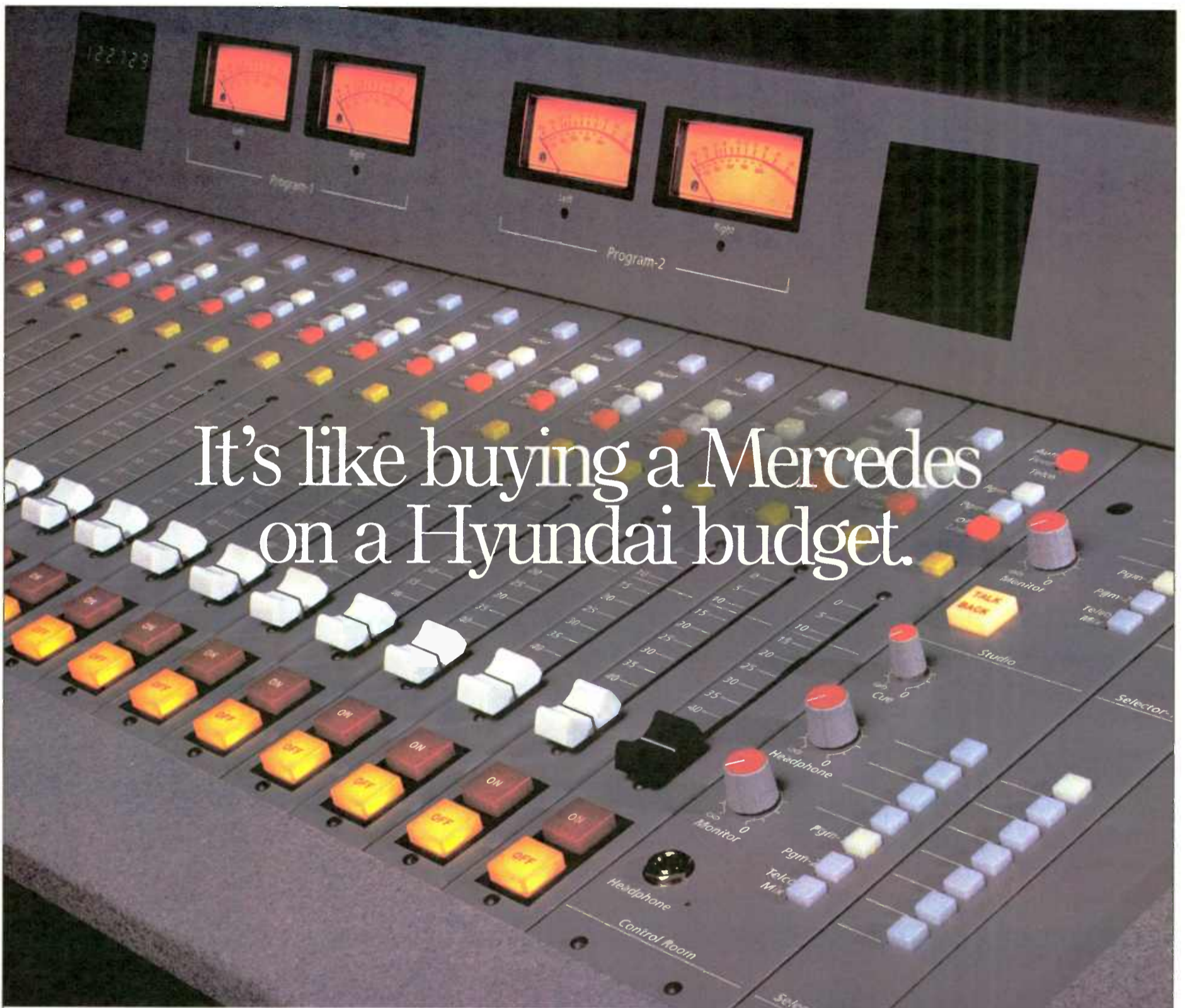
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World Radio History

ROOTS OF RADIO

# Soaps Brought Tears and Smiles

Richard W. O'Donnell

Not every vintage radio soap opera was a tearjerker, dripping with emotion, loaded with long-lost spouses who came back at the wrong time, amnesia cases galore, life and death emergency surgery, lost fortunes and other tribulations.

Some of them could actually make you smile.

Take "Vic and Sade," written by the great Paul Rhymer. Vic and Sade Gook were the folk who lived "in the little house halfway up in the next block." Two other characters, an adopted son named Rush and dear old Uncle Fletcher, were featured on the daily, 15-minute shows, which were always loaded with humor.

Each day brought a different situation, usually a slice of life made funny by the casual observations of the central characters as they chatted away. One day, it might be a discussion about some neighbor, or the high price of threads at the local store. An all-time personal favorite had to do with a conversation Sade and Rush shared one hot August day about the Christmas cards they planned to mail in December. "Vic and Sade" was loaded with chuckles.

Art Van Harvey played Vic, Bernardine Flynn was Sade, Billy Idelson was Rush, and Clarence Hartzell was Uncle Fletcher. They were about as funny a comedy quartet as show business has produced. Television has yet to produce anything that matched them. The NBC show came on the air in 1932 and lasted until 1946.

"Ma Perkins," as played by the wonderful Virginia Payne, was another soap opera that didn't spend all its time crying. These programs were called soap operas, by the way, because most were sponsored by soap companies back in the 1930s and '40s.

Ma was the brainchild of Frank and Anne Hummert, who created a number of daytime dramas over the years. Strictly homespun, radio's favorite mother did have her problems, but she gamely survived them with her happy outlook and her charming sense of humor. Ma Perkins never cried when she could smile. The program started on NBC in 1933, but by the time it went off the air in 1960, its home was CBS.

**A lovable bumbler**

Then there was "Lorenzo Jones," the only radio character who ever came close to matching Fibber McGee as a comic bungler. He was turned out by Hummert's soap opera factory and was a great favorite of the youngsters because he aired in the late afternoon. The kids could follow his misadventures after they got home from school.

Lorenzo was always doing stupid things in the hope of making a mint, yet you had to love the guy. He was fun. His long-suffering wife Belle was always nearby to save the bacon, when the script required it. Karl Swenson, one of radio's greatest actors, played Lorenzo, and Belle was played by Lucille Wall and Betty Garde over the years. The program arrived on NBC in 1937, and remained there until 1955.

Not all of these soaps aired during the daytime. Among others, "Amos and Andy," "Lum and Abner" and "Easy Aces" were essentially soaps held together by a comic thread, even though they were heard at night. The story lines on these particular shows usually lasted only a week or two; then a new comic situation would keep the laughter going.

Don't forget "Ethel and Albert," written by Peg Lynch, and featured on ABC from 1944 until 1950. Lynch played Ethel. Guess who played the kind and gentle Albert during the show's early years? It was Richard Widmark, who became a Hollywood star by playing the sadistic gunman in the 1947 film thriller,



Richard Widmark and Victor Mature

"Kiss of Death." After Widmark left the show, Alan Bunce took over as Albert.

For the records, "Ethel and Albert" had a last name: Arbuckle. The shows were humorous conversations between the pair about things that went on in their daily lives, including shopping, work, neighbors and misadventures. Many of their conversations were classics.

Even though many people now remember "The Goldbergs" as a nightly show, it ran for years as a daytime soap. It started on NBC in 1929, then bounced from network to network during its many reincarnations. It lasted until 1949. The Goldberg clan also was popular on TV during the medium's early years.

Gertrude Berg, who played Molly, was the star of the show. All soaps ran daily for 15 minutes in those days, and "The Goldbergs," the story of a Jewish family growing up in New York City, was no exception.

Molly's sense of humor was the key to the show. Life had its rough sledding, as it did on most soap operas, but Molly's wit and wisdom was close by when it counted. James R. Waters was husband Jake, Roslyn Siber was daughter Rosalie, and Albert Ryder was son Sammy. Beloved Uncle David was played by Menasha Skulnik.

Why "The Rise of the Goldbergs," as it was named early, never remained in one place on radio remains a mystery. It was a charming show, and an important page in radio history.

**Porch patter**

Do you remember "Clara, Lu and Em"? They were three women, as played by Louise Starkey (Clara), Isabel Carothers and Harriet Allyn (Lu) and Helen King (Em), who sat around on their front porches swapping gossip about their neighbors. The humor worked. This soap opera was on NBC first, then CBS, from 1932 until 1942. Like "The Goldbergs," it kept disappearing and coming back.

How about "Just Plain Bill," another soap that left you smiling? It was on daily radio, mostly NBC, from 1932 until 1955. Bill Davidson was a lovable old soul, a widower who endured with a sunny outlook on life. He never let his family problems knock him for a loop. Bill, a barber, was played by Arthur Hughes. "Polly Wolly Doodle" was the show's theme song.

For some reason, female writers seemed to dominate the long-running amusing soap operas. Myrtle Vail penned "The Story of Myrt and Marge," one of the great daytime programs. Super suds sponsored the show for years. It ran from 1932 on various networks until 1946.

Author Marge Vail played Myrt; her daughter, Donna Damarel, was Marge. They were two New York showgirls. The soap did shed its share of heavy tears, but the main characters never lost their ability to smile at their ups and downs. "Myrt and Marge" left you feeling good.

"Scattergood Baines" was another great one. Based on Saturday Evening Post stories written by Clarence

See SOAPS, page 28 ▶

## Define Impedance as X-Y Value

▶ CIRCUIT, continued from page 24

route where we go out some distance in some direction to directly get to the point representing Z. You can brush up on your trigonometry for the next article in the series, where we will look at rectangular-to-polar conversions.

For now, we will just look at a few special cases.

Earlier, we determined that the impedance was  $0+jXL$ . We have gone out 0 ohms along the X-axis and jumped up XL ohms. We can also express ZL in polar notation by noting that we have gone out XL ohms at an angle of 90 degrees (measuring counterclockwise from the positive X axis). Therefore,  $ZL=XL\angle 90$  in polar notation.

Similarly, we can determine the impedance of each of the other components listed in Table 1. We will start complex number arithmetic by looking at multiplication and division. To multiply two complex numbers in polar form, multiply the magnitudes and add the phase angles.

To divide two complex numbers, divide the magnitudes and subtract the phase angles. We will look at this in more detail next month, but for now, let us try an example.

Let's say we want to determine the current through a 1 mH inductor driven by a 1 volt, 1 kHz sine wave. Our modified Ohm's Law states that  $I=V/Z$ . Here,  $V=1\angle 0$ . That is, 1 volt at zero degrees (we will define it as our reference phase). The impedance of the inductor (ZL) is  $XL\angle 90$  from Table 1.  $XL=2\pi \times f \times L = 2\pi \times 1e3 \times 1e-3 = 6.283$  ohms. Putting it all together, we find:

$$I=(1\angle 0) / (6.283\angle 90) = 159e-3\angle -90$$

The current through the inductor is 159 mA at an angle of -90 degrees. Note that the magnitude of the current is  $1/6.283$  while the phase of the current is  $0 - 90$ . The negative phase angle tells us that the current lags the applied voltage (which we defined as being at zero degrees), just as we would expect the current in an inductor to lag the voltage.



Harold Hallikainen designs transmitter control and lighting equipment for Dove Systems, a manufacturer serving the broadcast and entertainment industries. He also teaches electronics at Cuesta College and is an avid contra dancer. He can be reached at (805) 541-0200, fax (805) 541-0201 or e-mailed at [hhallika@slonet.org](mailto:hhallika@slonet.org)

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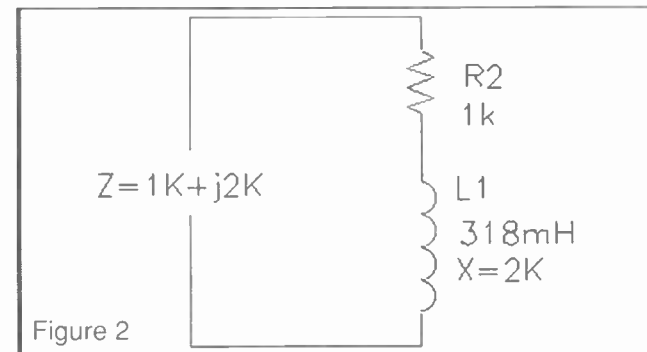


Figure 2

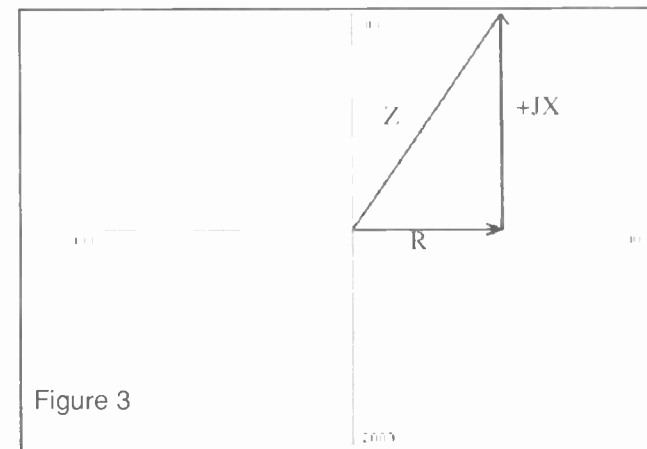


Figure 3

# Digital Boards Multiply at NAB '97

Mel Lambert with  
Alan R. Peterson

Two pieces of equipment in the typical radio station equipment chain remain analog despite all the digital changes going on around them: the console and the transmitter.

The switch to digital transmitters will have to wait for broader developments, but 1997 may be the year that radio stations begin to move in large numbers to the digital console camp.

The broadcast industry can be described as conservative at best. A range of technologies may be available, but buying decisions normally are based on a combination of expediency and "wait and see." Nowhere is this more obvious than in the on-air console market.

Although a handful of companies offer several practical digital console designs, many stations are reluctant to take the plunge. The companies are out in force at NAB '97 in Las Vegas to convince broadcasters to give a digital board a try.

## The feel of analog

According to Marketing Manager David Strode, the **Fidelipac MX/D** digital broadcast mixer has enjoyed modest sales success since its introduction late last year. More than 20 systems are now in the field.



The Fidelipac MX/D

Priced at less than \$10,000, the MX/D features eight dual-input analog/digital channels, with integral sample-rate conversion and routing to two stereo and one mono output. Sources and destinations can be a mixture of analog and/or AES/EBU-format digital ports.

All A/D conversions on the MX/D are

to 18-bit precision, with 24-bit internal processing. Fidelipac is considering adding parametric EQ and other refinements to the next software release.

"The MX/D is designed to look and feel like a traditional analog on-air console," said Strode, "but with the audio benefits of digital technology. We feel that the (radio broadcast) market is now fully appreciative of the benefits offered by all-digital designs."

The **Harris Broadcast DRC1000** carries a price tag of \$17,950. It features an expandable control surface with 10 faders and an LCD control screen. Up to 11 stereo or 22 mono AES/EBU-format sources, complete with sample-rate conversion, can be selected to any channel via a programmable input matrix; optional four-pair analog inputs are available, too.

Routing is to a total of seven digital output busses and seven analog ports, five of which have 18-bit converters and two offer 20-bit resolution. All channels feature five-band parametric EQ; compression/limiter and AGC functions are also available. Options include direct serial interface to the Orban DDS digital audio system, built-in reverb, time compression, a 7-second profanity delay and a 10-fader extender module.

## Advantage of digital

"Our system is not modeled on analog designs," said Harris Digital Products Manager Jim Hauptstueck, "because we wanted to take full advantage of the assignability and other benefits of digital. For example, we offer the ability to select any source to any channel fader, which provides enhanced flexibility for the user."

The DRC1000 features six Analog Devices high-power, 32-bit SHARC floating-point DSPs to provide the necessary processing horsepower.

The **Logitek Serial Sound**, making its debut at NAB '97, features a modular

design that combines a rack-mounted processing unit and a remote control surface. Each modular frame handles up to eight I/O cards equipped with 20-bit converters and AES/EBU-format ports.

The first available configurations will accommodate up to 64 inputs and 64 outputs; future designs will double these numbers. According to company President Tag Borland, "A 12-channel stereo system with 12 outputs will cost \$8,000; a fully-loaded 64/64 configuration will be around \$15,000."



Audiotronics' NuStar 3000

The design features two independent program, audition and cue busses, with profanity delay and compression. Parametric EQ and dynamics are planned for the fall.

"The assignable design is modeled after a conventional analog console," said Borland, "with controls in a familiar layout."

An LCD window above each channel displays input sources currently assigned to each channel fader, and I/O routing configurations can be stored and recalled by the user. Initial system setup and housekeeping functions are controlled from a separate PC terminal.

## Pure path

**Pacific Research & Engineering (PR&E)** is unveiling the all-digital Integrity broadcast console at the NAB convention.

The Integrity provides a pure digital signal path with an analog subsystem running in parallel. The analog path provides a fail-safe backup should the digital path require service.

According to PR&E Chief Operating Officer Michael Dosch, "The worst thing that can happen in radio is dead air. Therefore, in order for a digital console to be accepted by major broadcasters, it would have to offer at least the same level of reliability as its (analog) counterparts."

The user interface looks and feels like conventional analog designs, including the firm's BMX Series. The basic Integrity has two dedicated mic inputs, four mic/line selectable analog inputs and 10 stereo digital line inputs that are switchable to analog.

Additional features include DSP voice processing, advanced computer control of board configurations, including save and recall functions, and Session/Scheduler software.

Dosch said, "Our design will transparently and seamlessly handle not only analog sources but also digital inputs at a number of sampling rates." No pricing information was made available for the new PR&E all-digital offering.

Hailing from Germany, the **RCS Digital Console** by Klotz Digital is distributed domestically by **Radio Computing Services**, known best for its Selector music scheduling software. The first console to be commercially shipped is now in place at WQCD(FM) in New York.

The RCS Digital Console is a two-piece system, with a familiar console work surface and a remotely located CPU/audio unit. The two are linked via Ethernet with no actual audio routed through the control surface. Full 100-mm-throw faders on the work surface feature LED displays to show the name of the audio source. The displays change as the console is reconfigured for different projects.

## Thirty-bit bus structure

The heart of the RCS Digital Console is standard PC-compatible and has a 30-bit bus structure. Digital audio I/O is 24-bit AES/EBU, and analog audio users can select between 18- or 20-bit resolution. An internal router can handle 1,024 ins and an identical number of outs.

Options include graphic and parametric EQ, a compressor/limiter, noise gate and delay. Base price for a starter RCS

See DIGITAL, page 30 ▶

# Some Soapy Memories

▶ SOAPS, continued from page 27

Budington Kellard, the show started on CBS in 1937, and kept the chuckles coming until 1949.

Scattergood ran a hardware store in a town called Coldriver. The kindly old philosopher type, our hero wasn't bothered by the usual problems that torture soap opera characters. He was nagged by females who wanted to run his life. He also had an adopted son named Jimmy, and for years, the child's mother made



Virginia Payne and Al Hodge, Radio Actors in 'Ma Perkins'

life miserable for our central character. Baines was played by Jess Pugh, and through all his troubles, he never lost that sparkle in his eyes.

You couldn't see it. After all, this was radio. But the sparkle came through, loud and clear, over the airwaves.

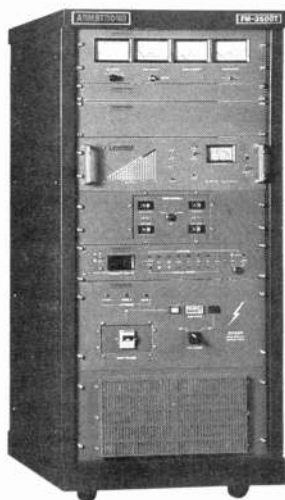
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*Dick O'Donnell is a freelance writer and old-time radio buff living in Florida. Reach him at (813) 842-6638.*

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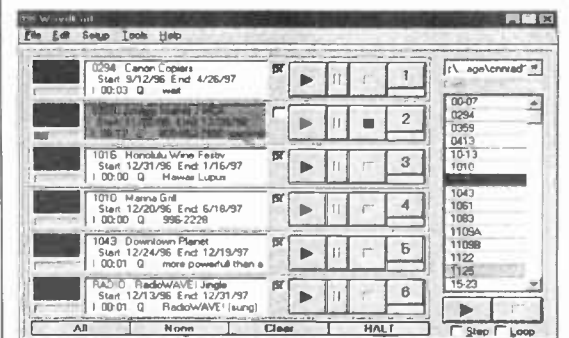
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# Digital Consoles

► DIGITAL, continued from page 28  
Digital Console is \$30,000.

From Tennessee comes the **Auditronics NuStar 3000** on-air digital console, a modular proprietary console designed specifically for on-air studio use.

Sales Manager Robert Greenwald recognizes that no station manager wants to buy a device that can soon be made obsolete.

"A design such as this one allows you to keep up with the times. This way a station can make its investment live 10 years," said Greenwald.

The Auditronics NuStar also uses a two-piece approach, with a control surface and rackmount processor. The control surface has 18 fader positions, each with A and B inputs. The rack unit contains the audio input cards, CPU and output system.

All audio is handled within the rack unit, with audio feeds returned to the console for headphone and monitor feed and to drive the meters. Line out for air-chain processing and the transmitter is on the rack unit.

At the heart of the proprietary computer is an Analog Devices SHARC CPU. A high-speed serial connection links the

floating-point DSP chips, the D-500 accommodates a variable number of analog and/or digital sources, routing to four separate program busses.

Input and output conversion is to 20-bit resolution. Modular systems with eight- to 32-input channels will be avail-



PR&E's Integrity

able. No EQ or compression is planned for the initial design. Quoted prices range from \$50,000 to \$85,000, dependent upon I/O configuration and other options.

In addition to a conventional on/off switch, each channel on the D-500 features an optional RS-232 port to command external hardware capable of bi-directional serial control. Additional options allow entire console settings to be scanned and stored to non-volatile memory and then recalled as necessary by the operator. The console's master module can store up to 99 bus assignments, input selections, fader settings and other user preferences.

According to Director of Sales Ray Esparolini, "The concept of a work surface and separate processing engine is well developed. But we have retained the 'look-and-feel' of analog, laying out the user interface with each control in a familiar position, ranging from the on/off switch at the bottom of the input module, through the fader, cue select, bus assign and on up to source selection. Anyone who has used an analog console will be able to understand the D-500."

"Yet ergonomics is only part of the equation. With the advent of DAB and other digital delivery media, audio per-



The Harris DRC1000

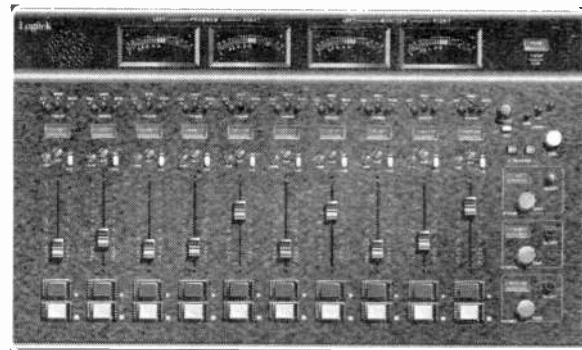
formance is of equal importance. Any new design must accommodate all of these design parameters, and more."

**Yamaha Corp. of America** is showing the Yamaha 03D digital recording mixer, intended primarily for the audio post-production and music recording markets. The 03D interfaces directly with digital audio workstations for automated digital mixing.

Providing a unique interface to digital audio editing systems is **Penny + Giles**, with the P+G DC16 digital audio workstation controller. It uses 16 endless-belt controllers with integral LED positional displays to

enable full fader automation for many DAW systems.

■■■  
*Mel Lambert is principal of Media&Marketing, a Los Angeles-based consulting service for the professional audio industry. Reach him at mediapr@earthlink.net or at (818) 753-9510. Alan Peterson is technical editor for RW.*



Logitek Serial Sound

## What Is Ahead for Unions?

► UNIONS, continued from page 14

who work for ABC Television. The union is using the concessions that it made to ABC in the agreement worked out over the network's radio employees as leverage in negotiating the TV contract.

"Our involvement in radio is minimal and actually it's just what has been left over from the past. It's just not worth it to us," he said. "I feel overall the trend of unionization in radio is going down and there is less interest in unions moving into radio."

Lotito disagreed, and again pointed to the increased visibility of organized labor.

"With this kind of clout and money ... and a grouping of employees that are otherwise disenchanted with management and concerned about the future

and their jobs, a union is becoming once again a viable alternative in order to try and find some relief or some perceived justice," he said.

Lotito also cited an increasing disaffiliation between employers and employees as the latter become concerned about job security issues and a perceived growing pay scale disparity.

According to Lotito, this elusiveness of the so-called "American Dream" is leading to a renewed interest in unionization, especially in companies going through substantial changes.

Enter the radio industry, and the consolidation trend within it.

### Labor relations

Lotito said managers must be aware of increased unionization efforts in radio and develop strategies to deal with the trend.

"The first thing that needs to be recognized ... is that a goal of any radio station or any organization ... should not be to be union-free. That's not a goal ... it's a by-product of establishing a positive relationship with the employees so that their allegiance runs to management. That is a function of good management."

Good management, according to Lotito, involves basic dignity and respect issues. "... (M)aking sure that employees have a vehicle in order to get their problems listened to and resolved ... a competitive pay and benefit package in place ... open communication. It's essential that the management and supervisory staff ... understand the station's commitment to union-free status. Management must also understand what they can and cannot do about it, and what their role is as far as making sure that the employees have good allegiance to the company so

the employees would never be inclined to join a union in the first place."

### Can't we all just get along?

Kathy Scott, director of communications at National Public Radio, said Lotito's comments work in theory.



Union Summer: An AFL-CIO Labor Rally

"(B)ut we're dealing with human beings that manage in a pressure-filled, day-to-day situation," Scott said.

Scott said NPR recently reached a contract agreement with AFTRA; union reps and management worked together to make the deal attractive, unlike the usual combative scenario.

"We're talking about a very strong environment of change right now throughout the industry. When we sat down to do the negotiations, our president and the president of AFTRA local worked together to make sure that we were sitting down in an environment of mutual benefit," she said.

Scott said despite a year of change and a future of uncertainty, the relationship between NPR and AFTRA is a good one. "The future is very prone to change, so we wanted to make sure that the people that have done so much to make NPR what it is today are along for the benefits, but at the same time that we have the flexibility as a company to do what we need to do to make sure we exist."

"So that's kind of how we sat down ... and came up with some interesting new provisions in the contract that recognize needs for flexibility for families. But at the same time, maybe the rate of increase of salaries is not as much as you might expect because of our need to keep an eye on the bottom line."

Scott said working on a mutually beneficial basis is key, and cited a deal with independent producers earlier last year over use of material on the Internet.

Scott stressed the mutual benefit of such agreements in order to move forward. "We need each other. We need them to produce what they do so well, and they need us to have a mechanism by which they can be heard. So there's no use fighting."



The RCS Klotz Digital Console

units together. For diagnostic purposes and local computer test capability, the clock and timer displays on the console surface double as logic readouts and status indicators when necessary.

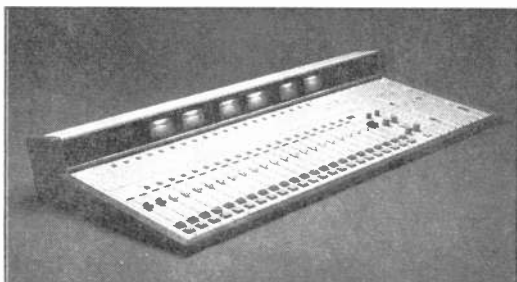
Four stereo mix busses come off the rack unit, and the digital output is 32 kHz with 18-bit resolution. Optional sample rates of 44.1 kHz and 48 kHz are also available.

Because the unit is specifically designed as an on-air console, habit dictates that the inputs remain as they are; therefore, the audio sources are not reconfigurable. Routing or changing audio sources must be done manually at the rack unit. Prices range from less than \$20,000 to \$30,000.

### Ergonomic

Also new at NAB '97 is the **Wheatstone Corp.** D-500 digital audio console, which is based on the firm's current analog layouts.

Combining the power of four, 40-bit



Wheatstone's D-500

# Marti's Influence Felt In Radio Every Day

W.C. Alexander with Paul J. McLane

The name Marti brings mental images of remote broadcasts, STLs, remote controls, telemetry return links, and antennas. How many of us think of the RPU transmitter simply as "the Marti"?

Recently, after more than 35 years of manufacturing his world-famous radio equipment, George Marti sold Marti Electronics to Broadcast Electronics. But any career review of this pioneer broadcaster would include not only his contributions to the industry, but his role as station owner, cattle rancher, former mayor and unretiring retiree.

George Marti was born in 1920 in Burleson, Texas, not far from where he lives now. At the age of 16, he passed the tests for the First Class Radiotelephone License, opening the door to a radio job at Tarrant Broadcasting Co. in Fort Worth.

He watched the transmitter site at KTAT(AM), which later became KFJZ. This entity was then owned by Elliot Roosevelt, son of FDR. The job paid \$1 an hour, not bad in those days.

"I was making \$40 a week at the age of 17, and I saved \$35 of it," Marti said. Even as a teenager, he knew he wanted to be in radio, and he was smart enough to develop a credit history with his local bank.

"I borrowed money ... when I didn't need it, and paid it back early, to build up a credit rating."

When he came of age, Marti enlisted in the Marine Corps and became a radar technician. Shortly after he returned home, he filed an application for a new radio station in Cleburne, a town of 23,000 located 25 miles southwest of Fort Worth.

To start the business, he and his father formed a corporation with \$25,000; George owned 72 percent of the company. His credit planning paid off when he secured a \$100,000 loan from the Farmers and Merchants State Bank in Burleson with his signature.

George signed on his new station, KCLE(AM) in 1947. The next year he put KCLE-FM on the air. He owned both until 1960. He also purchased and owned a station in St. Joseph, Mo., until 1969.

## Manufacturing

He had always been interested in electronics, as a ham operator and hobbyist.

"I built a remote pickup (system) for the Texas State Network in 1938 and 1939. We made backpacks for covering golf. They operated at 27 megacycles," he said. Those units, with 4-5 W power, laid the groundwork for his second career.

Marti went into manufacturing full-time in 1960. He had planned to retire after selling KCLE, but Art Collins of Collins Radio fame approached Marti about his RPUs, which had gained a good reputation.

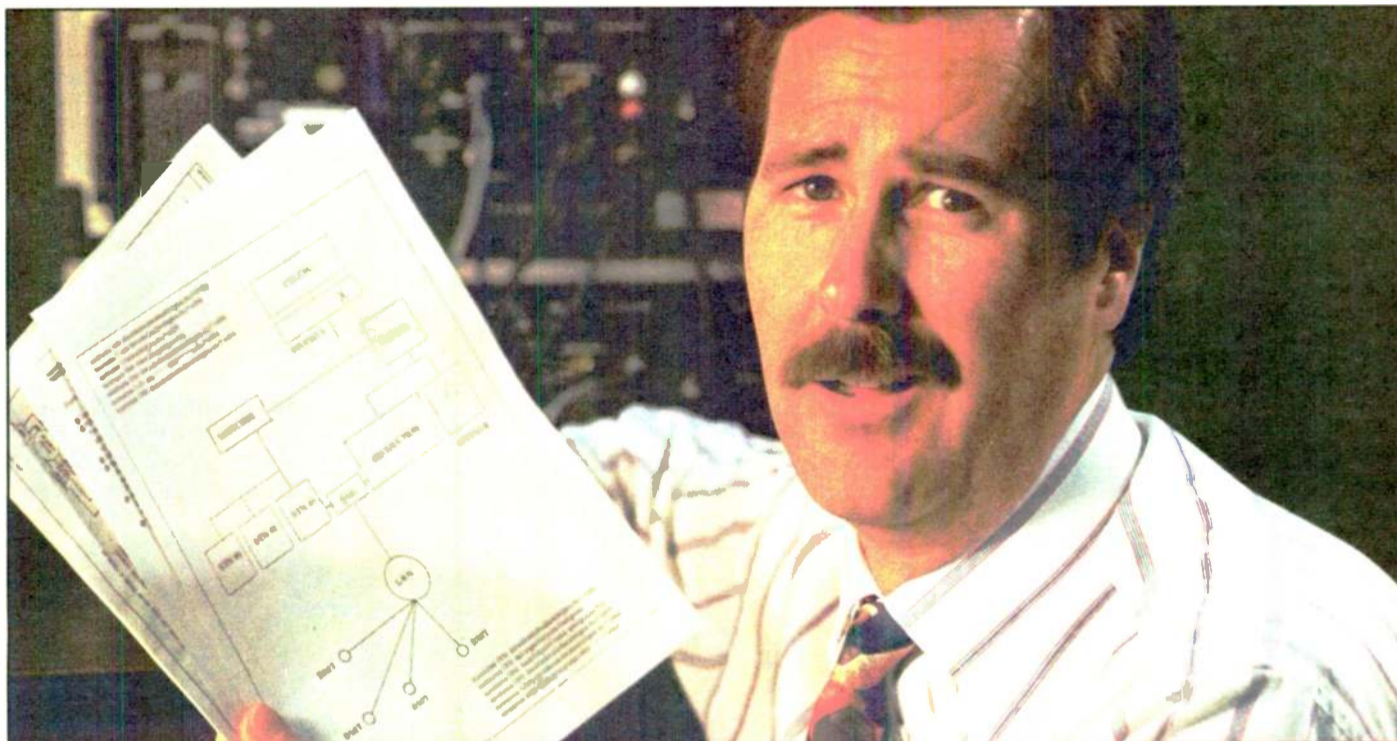
Collins offered Marti a five-year deal under which Collins would distribute Marti RPU equipment, in return for international exposure in the Collins catalog. Five years later Marti was established, and other distributors were lined up.

Marti succeeded by improving on early RPU transmitter and receiver designs. Marti asked small-market station owners what they needed and could afford, then designed and built the equipment within those parameters.

Marti gear found wide acceptance. Remote pickup gear allowed radio stations to take an active part in their communities, to cover news and create promotions.

"I basically established a new industry" with the RPU, he said. STLs, TRLs, remote controls, subcarrier generators and

See MARTI, page 33 ▶



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PERSONNEL LEVEL

## Prepare Yourself Now For the Worst Later

Sue Jones

In the radio industry today, job security is rare. Mergers and acquisitions by large broadcasting organizations are reasons to think about the worst case scenario — losing your job. Think about the consequences *before* something like this happens to you. It is your best defense.

You can take steps to avoid the ax, but, of course, there are no guarantees.

*Assume and expect change.* Even if your station enjoys stable ratings and sales, influences such as changing technology and economic changes can have a big impact on its operations.

*Network before you need to network.* Make it a regular part of your job. Work with other people in the industry through professional trade organizations to build relationships and to demonstrate your skills for others who may be able to hire or recommend you.

**Do it now**

*Get your résumé together.* Do it now, when you are free from any overwhelming pressure to do so. It is easier than you think. If nothing else, just take the résumé you used to get your present position and update it. Review it every six

months or so to make sure it includes any new responsibilities and duties.

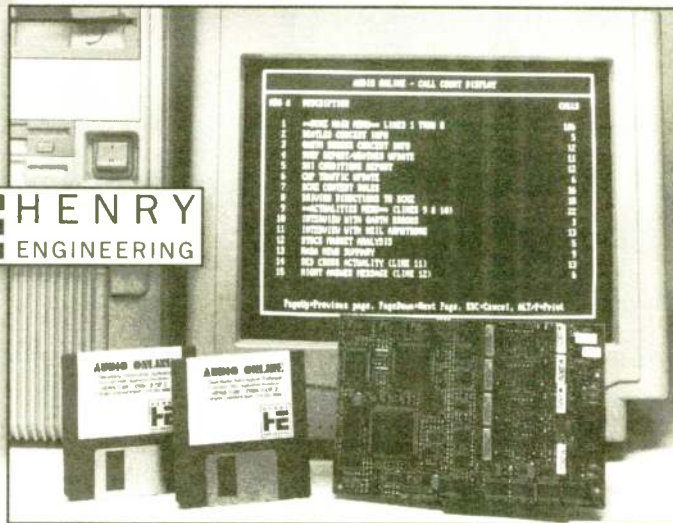
*Set aside enough liquid savings* to sustain you and your family during a job search. Human resource experts advise that you can expect to spend one month for every \$10,000 in earnings to find an equivalent position. For example, if your annual salary is \$45,000, you may need four or five months to find a position paying the same amount.

Liquid funds like savings accounts will be important if you find yourself in this position. Retirement accounts and credit cards can help you in an emergency, but carry tax ramifications and high interest charges. To live within your income and save regularly is a challenge, but the habit could help keep the roof over your head and feed the family while you search for the next job.

*Give some thought about your career goals* and where you would like to be 3, 5 or 10 years from now. Drifting from job to job as the need arises is not the way to build a successful career. Start preparing for your next position now. Perhaps you can change positions at the station, or you may be obliged to move to another station to get the desired

See PREPARE, page 33 ►

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Circle (15) On Reader Service Card

► PREPARE, continued from page 32  
 position. If you need additional training, seek it through cross-training or continuing education.

*Maintain good records of your achievements*, including copies of your work stored in an easily retrievable manner. If you are the station engineer, your achievements might include improvements to the station sound and signal, or cost savings realized through regular maintenance. Perhaps you saved money by performing in-house repairs instead of shipping equipment to manufacturers. You may have reduced off-air time, or cut down on the time required to repair equipment.

Keep good records of your successes. They will aid in résumé preparation and also be useful for performance evaluations (yours and your supervisor's). If you have a list of achievements, you may be able to share it with him or her before your review. Your supervisor may find the list helpful if he or she has not had time to keep one for you. Your boss might also forget an impressive cost-saving step you took 11 months ago. Your boss can also add your list to the group's accomplishments.

Without a list, you might forget about an important project, promotion or other contribution when you are under pressure to get a résumé together quickly to find a job. You might lose a lucrative job opportunity, because your résumé lacked the pertinent experience.

*Honestly evaluate your performance*

and/or take note of corrective criticism or comments that your supervisor or co-workers offer. Take the necessary steps to correct the weakness. You may be the best general manager, jock or engineer in the state, but if your interaction skills need work, your pay increases, promotions and job security may suffer, particularly if the station is acquired by a large organization that already employs several people in your field.

*Watch the local and national marketplace for trends* so you are not caught unaware. Keep up on mergers and ratings even though they may not have a direct bearing on your position. At the least, you will gain a better understanding of the industry. That knowledge may help you locate another job quickly, if necessary. Focus strategically on how you and your work can help your station. Keep

up-to-date on new products and services. *Comply with all station policy and procedures.* Guidelines established by management exist because managers believe that those rules are important for the smooth operation of the station. You want to be perceived as a team player working toward the same goals identified by the management. In tough times, or after a merger, the person who complies with the organization's guidelines and goals will be considered the most valuable.

The old axiom — "An ounce of prevention is worth a pound of cure" — is truer than ever.

■■■

*Sue Jones is a principal in a communications management firm located in the Washington area. Contact her at (703) 503-4999.*

## Marti's Marti Looks Back On a Career

► MARTI, continued from page 31

demodulators followed.

He helped develop the concept of satellite broadcasting, in which one control room is used to feed programming to stations over a wide area. This concept worked throughout central and north Texas, where Marti and Gary Moss helped turn around several stations.

Marti kept his hand in through ownership of a number of stations. He retains an ownership interest in five radio stations and is financing several others.

### Mayor and cattleman

Marti has been active outside of broadcasting too. He served as mayor of Cleburne from 1974 to 1986. In the early 1950s he was on the original board of the Texas Association of Broadcasters. He received its President's Award in 1982, and was named Pioneer Broadcaster by that organization in 1993. In 1991 he



George Marti

received the NAB Radio Engineering Achievement Award.

His all-time favorite Marti product, he said, is the BR-30, a 1960s-vintage, tube-type RPU transmitter.

Today, although no longer the owner of the company that bears his name, he remains a busy man. In addition to his station interest, he is involved in the ranching and raising of Charolais cattle on his ranch outside Cleburne. He'll turn 77 on May 5.

As one person who knows him well put it: "He is anything but retired."

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Photo by Read G. Burgan

The tower sections lie in deep Michigan snow.

# Tower Collapse Damages Antenna

Read G. Burgan

Sometime after 2 a.m. on Feb. 6, the top 100 feet of the WBKP-TV tower near Painesdale, Mich. came crashing to the ground, carrying with it the TV antenna and the top two bays of the antenna of WGGL-FM.

Deep Michigan snow hampered efforts to put the stations on the air with temporary equipment. Even then, the powerful radio station will lose much of its coverage area until later this spring.

WGGL is a 100 kW public radio facil-

ity licensed to Minnesota Public Radio. It covers a 95-mile radius in Michigan's Upper Peninsula, Wisconsin, northern Minnesota and Ontario.

The 500-foot tower was built and erected by the Central Tower Company for Scanlan Television in October 1996. It stands only 10-15 feet away from WGGL's original 400-foot tower, erected in 1971. Scanlan Television had provided WGGL with a new 12-bay antenna, mounted directly below the new Harris TV antenna. In return, Minnesota Public Radio provides the television station with space for its equipment in the WGGL transmitter building.

## The rubber band effect

The cause of the collapse was not known at press time. A local resident recalled hearing high winds that night, but added, "We've had a lot stronger winds."

The guy wires of both towers were tied to common anchor points. It appears that one of the fiberglass insulating rods connecting the guy wires to the tower shredded. The remaining two guy wires then acted like rubber bands on a slingshot and torqued the top section of the tower with sufficient force to shear the bolts holding the flanges on two legs while separating the flange on the third leg from its weld.

The falling tower section missed the transmitter building, landing only a few feet beyond it. Judging by the degree of bend in the remaining top section of the tower, it came close to toppling the entire structure. If it had, it would probably have taken the old WGGL tower with it. A representative of the tower company agreed that it's extremely unusual for a tower to lose only its top portion.

## What happened?

WGGL's transmitter didn't miss a beat. It continued broadcasting into the damaged antenna. In fact, WGGL engineer Todd Schafer didn't learn about the disaster until reading about it in the local newspaper at 8 p.m. He then lowered the power to 5 kW. "It's very unstable with the open bay. And every day that goes by, the transmission line is deteriorating," Schafer said.

WBKP-TV continued to broadcast throughout much of Michigan's Upper Peninsula using a fiber-optic link installed at its studio after the tower collapse.

Temporary low-power antennas were shipped to the site for both WGGL and the TV station. A crew from Central Tower arrived to begin work on replacement, but severe icing on the tower prevented them from making much progress initially.

A snowfall of nearly 200 inches hampered access to the remote site. In fact, a bulldozer and a front-end loader from a construction company spent more than 27 hours opening the road. "For the most part, the snow was up to the top of my cylinders," the bulldozer driver said.

WGGL should lose little airtime through this disaster, but its coverage area will be cut considerably. Total cost of the loss was pegged at around \$250,000 by Tom Scanlan, owner of the TV station but he said this should be covered by insurance.

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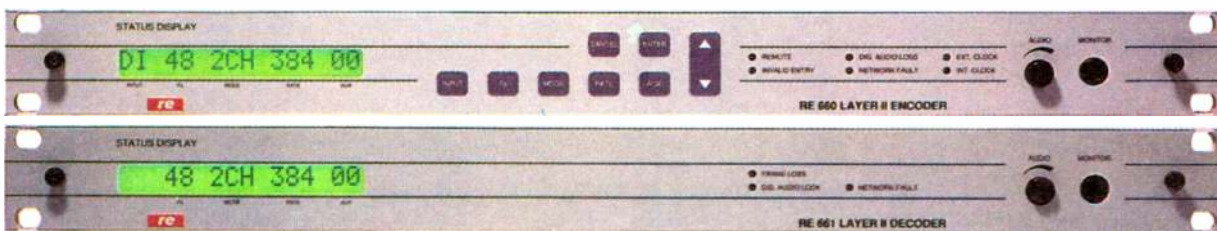


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# Preparing Stations for Emergencies

Lynn Meadows

Being prepared for a disaster means more than having an Emergency Alert System (EAS) box installed. Even areas that are safe from floods, hurricanes and earthquakes are not immune from man-made disasters caused by terrorism and vandalism.

That is one reason the NAB Broadcast Engineering Conference '97 includes a session titled "Emergency Planning: Staying on the Air."

"It's on top of people's minds these days," explained John Marino, director of technical conferences for NAB. He said the panel will provide engineers with a resource from which to draw so that they can, in turn, prove to management that a backup site is necessary.

The panel will be moderated by Jerry Whitaker, chairman of the NAB Engineering Conference Advisory Committee and author of several books, including "The Electronics Handbook." He will be joined by three paper presenters, who bring unique perspectives on emergency planning.

## Minimize off-air time

Sanford B. Cohen, president and general manager of Prescott Valley Broadcasting Co. in Arizona, will discuss the redundancy his stations employ, and other backup options broadcasters may want to consider. Prescott Valley is the licensee of KPPV-AM-FM.

With planning and a little capital investment, Cohen said, a station should never have to be off the air longer than an hour. The longest his station has been off the air is 45 minutes, and only that long because a flat tire interrupted the engineer's trip to the transmitter site.

Cohen has built a lot of redundancy into his station because the main transmitter site for the Prescott Valley FM station is a termination point for the power grid. If power goes out anywhere along a 20-mile line, the station goes off the air.

To compensate for the awkward positioning, station managers have set up a solar-powered auxiliary transmitter site. In the event of several cloudy days in a row, the station has yet another backup, this one propane-powered.

Cohen said he will bring slides of the solar-powered plant. He said there is "nothing terribly mysterious about it once you've seen what it looks like." In addition to describing the system at his stations, Cohen will talk about smaller and less expensive options available to broadcasters who want to plan for emergencies.

Although the backup configuration at KPPV is elaborate, Cohen said it was designed to be user-friendly. He said front-office personnel can easily operate the system if necessary.

Explaining his philosophy on emergency planning, Cohen said, "I don't get stressed. I get ready."

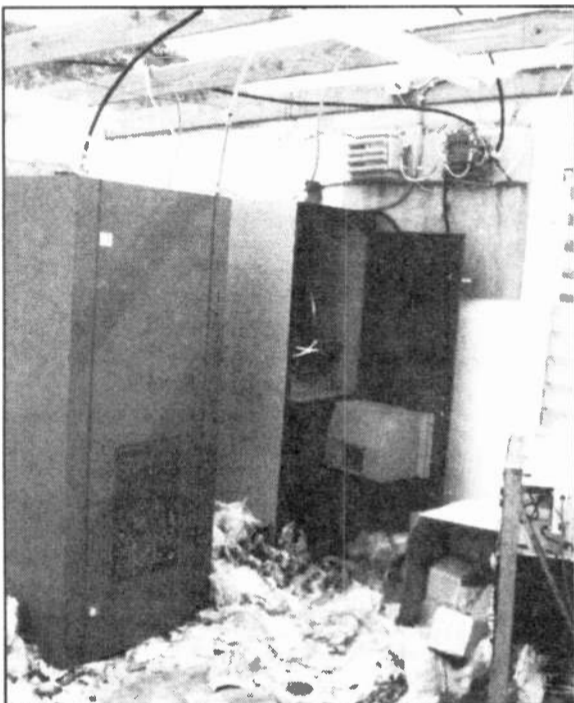
The second speaker will be Thomas G. Osenkowsky, a radio engineering consultant based in Connecticut and frequent contributor to *RW*. Osenkowsky will discuss what to do before catastrophe strikes. He will cover a range of aspects, from tower planning and building security to insurance coverage.

## Before disaster strikes ...

Osenkowsky will also talk about getting back on the air quickly once disaster does strike. As Whitaker said, dealing with a downed tower is "far and away" the most frightening situation an engineer can face.

The final panelist scheduled is David C. Kobe of Harris Corp. His paper looks at case studies in emergency planning for radio and TV stations, and will cover backup equipment and contingency planning for new technologies. Whitaker called Kobe's paper "very timely."

According to Whitaker, the NAB held a similar session some years ago after severe earthquakes struck California and Hurricane Andrew hit Florida. The idea this year, he said, is not just to talk about how to react in an emergency, but how to plan for them when a station is built.



You cannot avoid hurricanes, but you can prepare for them.

# Crystal Award Nominees

The finalists for the National Association of Broadcasters Crystal Awards, which will be given out at the Radio Luncheon during NAB '97 to honor 10 stations for community service:

- KASE(FM), Austin, Texas
- KBHP(FM), Bemidji, Minn.
- KCMO-FM, Kansas City, Kan.
- KEGE-FM, Minneapolis, Minn.
- KGMX(FM), Lancaster, Calif.
- KKBT(FM), Los Angeles, Calif.
- KKRZ(FM), Portland, Ore.
- KLIZ-FM, Brainerd, Minn.
- KMAS(AM), Shelton, Wash.
- KMBZ(AM), Kansas City, Mo.
- KPRS(FM), Kansas City, Mo.
- KRMG(AM), Tulsa, Okla.
- KSSN(FM), Little Rock, Ark.
- KTAR(AM), Phoenix, Ariz.
- KTRH(AM), Houston, Texas
- KTTS-AM/FM, Springfield, Mo.
- KUZZ-FM, Bakersfield, Calif.
- KVFD(AM), Fort Dodge, Iowa
- KWOA(AM), Worthington, Minn.
- KWSN(AM), Sioux Falls, S.D.
- WAKR(AM), Akron, Ohio
- WCBC(AM), Cumberland, Md.
- WCCO(AM), Minneapolis, Minn.
- WCMT(AM), Martin, Texas
- WDBO(AM), Orlando, Fla.
- WDSN(FM), DuBois, Pa.
- WGAR-FM, Cleveland, Ohio
- WGN(AM), Chicago, Ill.
- WGRE(FM), Greencastle, Ind.
- WGST(AM), Atlanta, Ga.
- WHFS(FM), Annapolis, Md.
- WHUR-FM, Washington, D.C.
- WIBC(AM), Indianapolis, Ind.
- WJLS-FM, Beckley, W.Va.
- WKLZ(AM)/WKLZ(FM), Traverse City, Mich.
- WKLX(FM), Rochester, N.Y.
- WKTI(FM), Milwaukee, Wis.
- WLEN(FM), Adrian, Mich.
- WLTE(FM), Minneapolis, Minn.
- WMMX(FM), Dayton, Ohio
- WSM(AM), Nashville, Tenn.
- WTVB(AM), Coldwater, Mich.
- WZKD(AM), Orlando, Fla.
- WZWW(FM), State College, Pa.
- WZZK-FM, Birmingham, Ala.

# Radio Pioneers Will Be Honored at NAB '97 Ceremony

Chris Joaquim

Four legends of the radio and television industry will receive American Broadcast Pioneer Awards at the Broadcasters Foundation Pioneers Breakfast to be held on Wednesday, April 9, at the Las Vegas Hilton Hotel.



Alvin G. Flanagan

The presentations are made by the Broadcasters' Foundation at the annual convention of the National Association of Broadcasters.

The honorees are Richard W. Carlson, president and CEO of the Corporation for Public Broadcasting; Alvin G. Flanagan, retired president,



Jerry Lee

Gannett Broadcasting; James L. Greenwald, chairman emeritus, Katz Media Corp.; Jerry Lee, owner, WBEB(FM), Philadelphia.

Carlson's career spans 31 years, notably including service as a radio and television reporter, producer, and Associate Director of the U.S. Information Agency.

Greenwald's 40-year career in the national radio and television representation business began as salesman at Katz Radio.

He retired as chairman and CEO of Katz Media Corp., which had grown into the largest media sales company

in the country.

Lee helped make WLIF-FM (formerly WAQE-FM) in Baltimore, within four years, the station with the largest FM audience in the country. He was named Radio Man of the Year by the Radio Advertising Bureau in 1997.



Richard W. Carlson

Flanagan began his career with legendary KDKA(AM) in Pittsburgh. After World War II he embarked on a television career, working for KBTB in Denver and Gannett Broadcasting, serving as president of the Gannett Broadcasting Group until his retirement.



James L. Greenwald

The annual American Broadcast Pioneers breakfast is sponsored for the second consecutive year by the National Association of Media Brokers.

To make reservations, call the Foundation office at (203) 862-8577. There is no charge for admission.

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# NAB 1996-1997 Radio Board

*\*Ineligible for re-election*

*\*\*Re-elected to another two-year term, to begin with June 1997 board meeting.*

District 1 (New England)  
Richard A. Ferguson\*  
NewCity Communications  
Bridgeport, Conn.

District 2 (New York, New Jersey)  
William O'Shaughnessy  
WVOX(AM)-WRTN(FM)  
New Rochelle, N.Y.

District 3 (Pennsylvania)  
Jerry Lee\*  
WBEB-FM  
Bala Cynwyd, Pa.

District 4 (Delaware, the District of Columbia, Maryland, Virginia)  
William Poole  
WFLS-FM, WYSK-AM-FM  
Fredericksburg, Va.

District 5 (West Virginia, Kentucky)  
Bill R. Evans\*  
WQXE-FM  
Elizabethtown, Ky.

District 6 (North Carolina, South Carolina)  
William L. McElveen  
WISW(AM)-WOMG(AM)-WTCB(FM)  
Columbia, S.C.

District 7 (Florida, Puerto Rico, Virgin Islands)  
Dean Goodman\*\*  
WINZ(AM)  
Paxson Communications Corp.  
West Palm Beach, Fla.

District 9 (Georgia, Alabama)  
Michael H. McDougald\*\*  
WRGA(AM)-WQTU(FM)  
McDougald Broadcasting Corp.  
Rome, Ga.

District 10 (Indiana)  
Kenneth S. Coe  
WLOI(AM)-WCOE(FM)  
LaPorte, Ind.

District 11 (Ohio)  
Walter Stampfill  
WNCO-AM-FM  
Ashland, Ohio

District 12 (Missouri, Kansas)  
Curt Brown\*  
KTTS-AM-FM  
Springfield, Mo.

District 13 (Michigan)  
Verna Greene\*\*  
WJLB(FM)-WMXD(FM)  
Evergreen Media  
Detroit

District 14 (Iowa, Wisconsin)  
Mark Hedberg  
Hedberg Broadcasting Group  
Mason City, Iowa

District 15 (Tennessee, Arkansas)  
Bobby Caldwell\*\*  
KWYN-AM-FM  
East Arkansas Broadcasters  
Wynne, Ark.

District 16 (Colorado, Nebraska)  
Dick Maynard

KEKB(FM)-KBKL(FM)  
Grand Junction, Colo.

District 17 (Illinois)  
Roger H. Coleman\*\*  
WHHK-FM Coleman Broadcasting Co.  
Galva, Ill.

District 18 (Southern Texas)  
John Barger  
KRIO(FM)  
San Antonio

District 19 (Oklahoma, Texas)  
J.R. Curtis\*\*  
KFRO-AM-FM  
Longview, Texas

District 20 (Montana, Idaho, Wyoming)  
Larry Roberts  
Sunbrook Communications  
Missoula, Mont.

District 21 (Minnesota, South Dakota, North Dakota)  
Steven W. Linder\*  
KWLM(AM)-KQIC(FM)  
Lakeland Broadcasting Co.  
Willmar, Minn.

District 22 (Arizona, Nevada, New Mexico, Utah)  
Jerry Ryan  
KESZ(FM)-KOAZ(FM)  
Phoenix

District 24 (Southern California, Guam, Hawaii)  
Howard Anderson  
KHWH Inc.  
Los Angeles

District 25 (Oregon, Washington)  
Gary M. Grossman\*\*  
KRKT-AM-FM  
Albany, Ore.

## Designated board seats:

Ricardo A. del Castillo  
Tichenor Media System  
Dallas

Steve Dodge  
American Radio Systems  
Boston

Martha Dudman  
Dudman Communications  
Ellsworth, Maine

Paul Fiddick  
Heritage Media Corp.  
Dallas

William Figenshu  
Viacom Broadcasting  
New York

Mark Mays  
Clear Channel Communications  
San Antonio

Bruce T. Reese  
Bonneville International Corp.  
Salt Lake City

William E. Shearer  
Personal Achievement Radio  
Los Angeles

## Network Representatives:

Ronald R. Davenport  
Sheridan Broadcasting Corp.  
Pittsburgh

David Kantor  
ABC Radio Networks  
Dallas

Jeff Lawenda  
Westwood One Radio Networks  
New York

## Newly elected board members to begin serving with the June 1997 board meeting:

District 1 (New England)  
Richard W. Osborne  
WKXL-AM-FM  
Concord, N.H.

District 3 (Pennsylvania)  
James J. Carter  
WTAE(AM)-WVTY(FM)  
Hearst Broadcasting  
Pittsburgh

District 5 (West Virginia, Kentucky)  
Walter May  
WBPA(AM)  
East Kentucky Broadcasting Corp.  
Pikeville, Ky.

District 11 (Ohio)  
Louis P. Vito  
WBLL(AM)-WPKO(FM)  
V-Teck Communications  
Bellefontaine, Ohio

District 23 (Northern California, Alaska)  
David Benjamin  
Community Pacific Broadcasting  
Monterey, Calif.

## DOJ's Klein To Speak at NAB '97

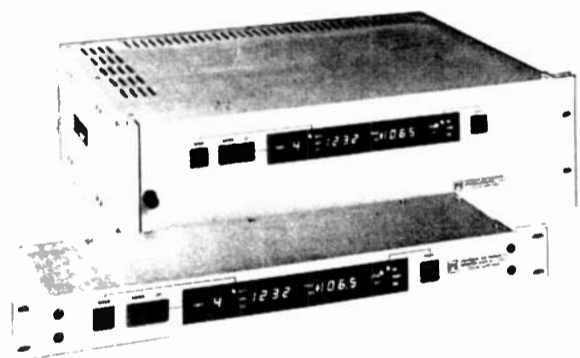
A central figure in the debate over the U.S. Justice Department's role in monitoring station consolidations will speak at NAB '97 in Las Vegas.

Joel I. Klein is acting assistant attorney general of the antitrust division, a position that has placed him squarely in the middle of the antitrust and station merger debate. In March President Clinton nominated Klein to the post officially.

Klein is a late addition to the list of speakers at the Broadcasters' Law and Regulation Conference. He will speak on Monday, April 7 at 2 p.m. in Room 242 of the Las Vegas Convention Center, and will field questions from broadcasters after his remarks. The session is called "Station Consolidation and the Department of Justice — A Dialogue."

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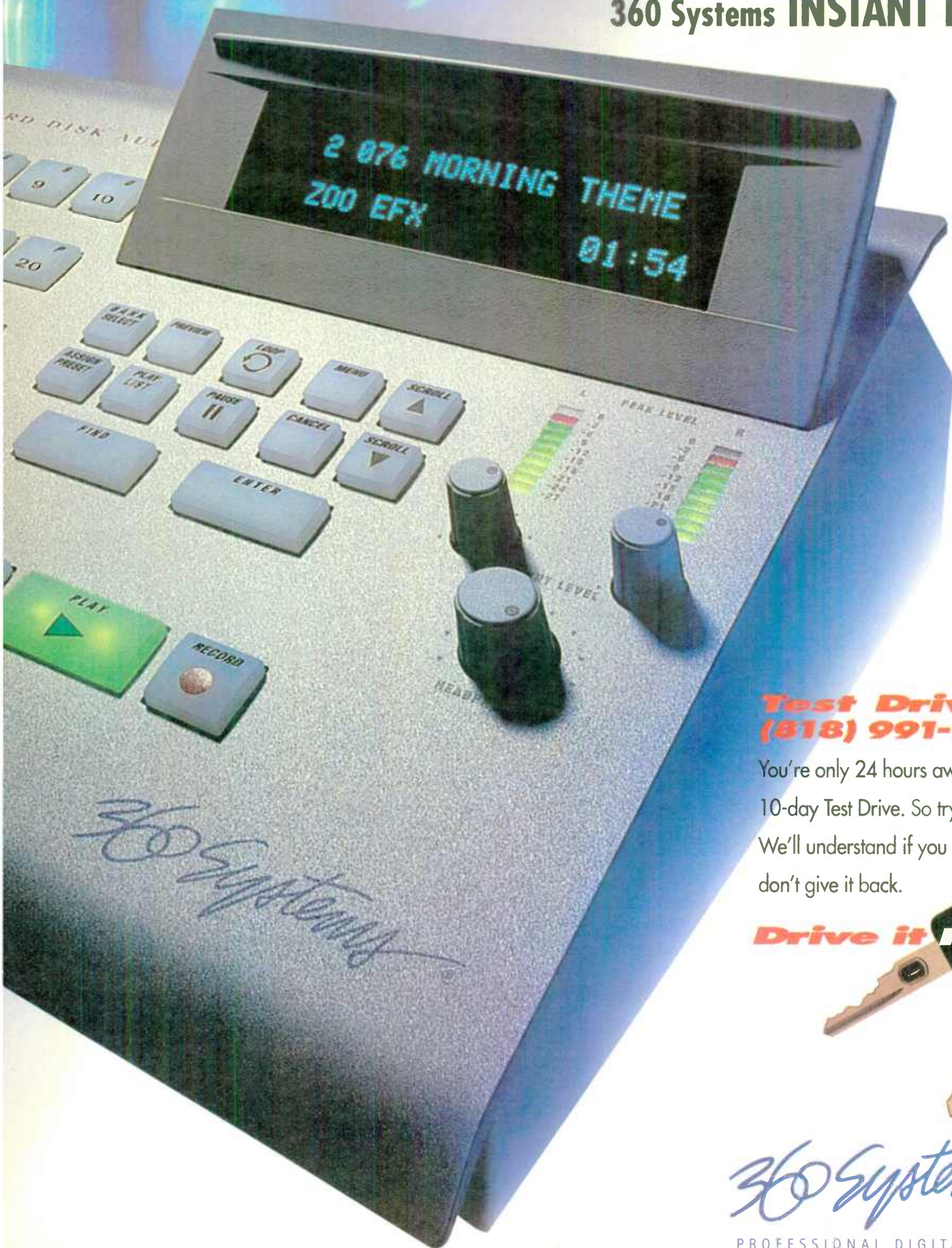
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World Radio History

# Duopoly Impact Varies With Market

Lee Harris

Prominent on the program at NAB '97 is a seminar titled "Duopolies, LMAs and Ownership Changes: Acquiring Stations While Avoiding Regulatory Traps."

The effects of duopoly vary greatly. Larry Fuss is president of Delta Radio Inc., owner of WDTL-FM/WDSK(AM), Cleveland, Miss., WOHT-FM, Drew, Miss. and KDTL-FM, Lake Village, Ark. All four stations are headquartered in Cleveland, although KDTL maintains separate offices and studios in Greenville, Miss.

"Simply put, pre-duopoly there were too many radio stations in these small markets," Fuss said. "We had six commercial radio stations in Cleveland, a town of 15,000 people. When a lot of these stations were individually owned, nobody could make any money. Now I have two FMs and an AM and so does my competitor."

Fuss said duopoly has been salutary for Cleveland. "When there was only the one AM-FM combo here in town, they didn't have to be aggressive, and as a result there were a lot of businesses that never advertised on radio. When we came in with our stations, we not only put money in our pockets, but we probably generated ad dollars for the competition, just by making more people aware

of radio."

Fuss said the most challenging element of duopoly is selling so many stations in such a small market. "We tried the separate sales staff approach a lot of the consultants recommend, but in a small market it's hard enough to have one good sales staff, much less two or three, so we're back to combo-selling now. The problem with that is the salespeople tend to gravitate toward the dominant station, the one that's the easiest sell, and the other stations suffer as a result."

From an operations standpoint, Fuss said, running four stations under one roof isn't much more difficult than operating a traditional AM-FM combo, except that

when something does go wrong, problems tend to multiply.

"You've got four transmitters that can get knocked off the air by lightning or four different automation systems that can crap out when there's a power surge. But it's generally the same problem, so you're better equipped to deal with it."

So far, the town appears big enough for the two operators, but in a perfect world, Fuss would have Cleveland all to himself. "With the number of signals actually in the market, either our company or our competitor could legally own everything in town. If I had the money, and they were willing to sell, I'd probably buy them out so I would be the dominant radio guy in town. I feel that I am now, but if I owned everything in town there would be no debate."

At the opposite end of the market spectrum is Scott Herman, vice president and general manager of all-news WINS(AM), one of seven CBS radio stations in New York City. (He was recently promoted to senior vice president, news, of CBS Radio. He will stay on at WINS.)

Talking to Scott, you get the impression that only the letterhead has changed since WINS was the flagship of Group W radio.

"We made the strategic decision as a company to operate each of the stations individually, and in my world I'm focused on WINS," Scott said. "We sell individually, we don't package the station up, we all have our own local reps out there fighting for dollars. The big difference is that we now share information among the stations."

Herman said having that information gives WINS and the other CBS stations in the market a bit of an advantage when dealing with agency buyers. "Buyers like dealing with individual stations so they can cut the best deal. They knew what they were paying on every station in the market. Now, because we own all these stations, we also have that information."

The WINS situation is interesting because CBS now owns both it and archival, all-news WCBS(AM). But Herman said even this oddity didn't require major repositioning on his part.

"We've never negative-sold against WCBS anyway, since a negative pitch against them is a negative pitch against the all-news format ... we're really two different radio stations for two different audiences."

But Herman insisted that having WCBS in the fold has done nothing to dampen the fierce competition in which the stations have been engaged since 1968.

There has been some back-office consolidation, but the CBS New York radio stations continue to operate out of four different facilities, and each station has its own general manager.

"It's so costly to move a radio station, especially here in New York, that I don't think the benefits of having all the stations under one roof would outweigh the cost of making that happen."

As for consolidating multiple stations under a single general manager, Herman said it has already been proven that stations run more successfully when managers are focused. "In a smaller market, where the P&L can't sustain individual managers, that's one thing. But certainly in a market this size you can justify a manager for each station," he said.

"When the CBS-Westinghouse deal went through, everybody was asking why would we keep two all-news stations. But both stations are enormously successful, and it boggled my mind to imagine why people would think that we wouldn't own two!"

# Eliminate Carts for \$7,000

## Scott Studios' Spot Box

At last! A commercial player that works just like carts, but with digital audio that sounds like compact discs.

It's Scott Studios' new Spot Box. It's the first hard disk "cart" replacement that jocks really like!

It's easy to use: You get four Start buttons for four recordings, just like a quadruple deck "cart" player.

The Start button clearly counts down the remaining time of each cut. Every deck shows "bar graph" VU levels.

When a "cart" finishes, the label and buttons turn grey to lock out accidental re-play. It can air again with a touch of the Replay button (at the lower right). If there are more than four "carts" in the set, the "on deck" spot moves from the fifth line (at the right of the time and date) to the grey deck that had played. The Spot Box can also remote start CD players.

The Manual-Auto button (at the right of each label) lets you start each spot manually or have the Spot Box smoothly start the next one itself. Automatic sequencing can also be turned on or off globally, by categories or shifts.

Pause buttons can stop (and resume) playback of any cut. During a Pause, the Start button can replay that recording from the beginning.

Each deck has a Fade button. It helps if you need to fade something out gracefully with one touch.

The Spots and Jingles buttons at the lower left take you to a "Wall of Carts" screen that shows all of your hundreds of recordings. You can jump immediately to whatever you want by touching the first letter of its name on the large alphabet at the top of that screen. Pick and play it quickly in any "cart" deck.

As an option, we can automatically bring logs into the Spot Box from your traffic computer. Then, after the spot set has finished, the Load button at the lower right automatically brings in the next break.

You can quickly rearrange the order of any recordings with the Up and Down Arrows.

Scott Studios' Spot Box not only sounds better than any "carts" you've ever heard, its labels look better and are easier to read than any "carts" you've ever seen!

You get four legible lines of useful label information: Names, numbers, out-cues, announcers, intros, lengths,



Here's a reduced size view of Scott Studios' 5"x8 1/4" Spot Box. You get easy access to hundreds of commercials, jingles, sounders, comedy and other recordings. All audio is CD quality digital from hard drives.

endings, copy info, start and end dates and times, schedule times, and anything else you want. Labels are even color coded. When you have several cuts rotating as one number, you see exact lengths. Both the name and out cue match the exact cut that plays. The Spot Box even rotates recorded tags.

If you have several stations in one building, record each spot only once. It's instantly playable in every desired studios' Spot Box, without re-dubbing or retyping labels. Cuts can be locked so they only play on designated stations or shifts.

You also get printouts showing exactly when each spot plays!

Best of all, Scott Studios' digital audio is affordable. A "four-deck" Spot Box player storing 600 minutes in stereo starts at \$6,000. You can record and edit spots or phone calls in the air studio during songs for only \$1,000 more. A production studio recorder-editor is \$5,000, and it can even go on-the-air if needed. 600 additional minutes of stereo storage is only \$250. Larger screens and a variety of backup options are available. At Scott's low prices, you can afford as much storage and redundancy as you want.

Also check out Scott Studios' Hot Box. It plays any of 62 "Hot Keys" instantly at the touch of a finger. You get 52 sets of 62 clearly labeled Hot Keys: 3,224 digital cuts for only \$5,000.

Scott Studios also offers other digital systems for satellite formats, music on hard drive and voice track automation. Call 800-SCOTT-77 for details, or a no-obligation trial in your station.

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# BROADCAST

## Communique

HARRIS CORPORATION, BROADCAST DIVISION

DIGITAL RADIO HIGHLIGHTS

NAB 1997

### CONTENTS

#### 2 New Product Source: NAB '97 Radio Highlights

*CD2001, third-generation Harris CD Cart Machine, adds AES3 Digital Output to its list of benefits...  
Harris DRC1000 — bringing the benefits of a digital audio console to radio...  
Orban DSE 7000FX— best-selling workstation adds four times more DSP power...  
Orban AirTime— more than a digital delivery system... a cure!...  
Harris DIGIT CD digital FM exciter adds second-generation features...  
Harris Platinum Z Transmitters— Finally! True digital modulation and solid state reliability at a price comparable to vacuum tube transmitters...  
Harris A2D2A— inexpensive, high-quality A/D and D/A that works like a hog*

#### 4 Why Would You Want An Uncompressed Digital Audio Air Chain and How Can You Go About Implementing One?

*A panel of Harris staff members with expertise on digital products from the radio studio through the antenna discuss the benefits of digital technology in general and the uncompressed digital audio air chain in particular. Harris staffers also share tips for implementing the digital chain.*

#### 6 Harris Staffers To Present Six Papers At NAB 1997 Engineering Conference

*From examining and implementing new digital technologies to adjusting emergency services plans to meet new requirements, Harris staff members will address vital industry concerns.*

#### 6 How And Why You Should Convert To An All-Digital Studio Path

*Harris VP and Radio Product Manager Geoff Mendenhall shares information and advantages of the AES3 digital path.*



## Harris CD LINK™ 950 MHz Aural STL Completes Uncompressed Digital Air Chain

Premiering at NAB 1997, Harris' CD LINK™, a 950MHz digital STL, overcomes the final technical hurdle in the totally uncompressed digital audio air-chain. This revolutionary STL transports *uncompressed* AES3 studio-standard digital audio over a standard 300kHz RF channel.

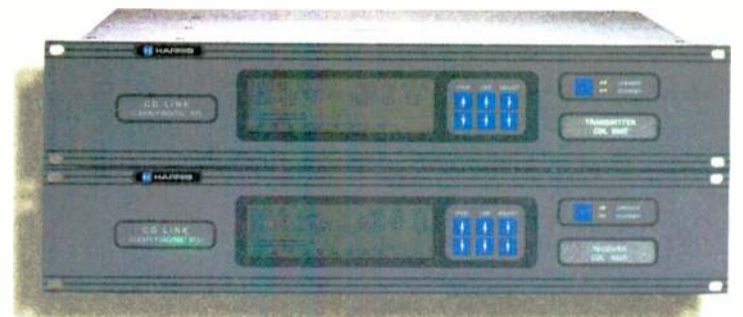
Until now, it has been common to have at least one component that uses lossy compression in the digital audio chain. Lossy compression is a bit reduction technique used to fit a digital signal into a specified bandwidth. This technique uses psychoacoustic digital compression algorithms that commonly eliminate 75% of a signal's digital audio content. Content that is eliminated becomes irretrievable.

When two or more components in an air-chain use lossy compression, cascading algorithms can occur, causing very noticeable distortions in audio quality. Until now, all 950MHz STLs have used lossy compression. CD LINK gives you all the sound your studio is capable of producing.

The CD LINK provides superior performance with a typical signal-to-noise ratio of 93dB and frequency response of +/-0.1dB. Beyond a robust signal with improved fade margins, CD LINK offers many other user benefits. A spectrum-efficient RF design allows CD LINK to transport one AES3 stereo signal and two data channels simultaneously. An analog stereo composite output as well as two 6kHz or one 12kHz auxiliary audio channels are available as options.

The CD LINK's transmitter and receiver are each housed in a single, 3-1/2" rack-mountable chassis which contains all digital and RF circuits. The unit, which is designed for ease of installation with an AES3 XLR or optical input connector, Type N RF output connector and a universal AC power supply, fits in the place of existing analog STLs.

For more information about the CD LINK and complete specifications, please send your written request to Harris via fax (217-222-0581) or e-mail (hbd@harris.com).



### Harris CD LINK™ Benefits



- Drops in place of existing 950MHz STLs.
- Provides uncompressed digital audio.
- Fits in standard 300kHz bandwidth.
- Delivers better audio.
- Has better fade margins.
- Provides higher-quality auxiliary audio than most other solutions (two 6kHz or one 12kHz audio channels for SCA use or for feeding an AM transmitter).
- Has extra data capacity in form of RS232 port (either two 4800 baud or one 9600 and one 4800 baud).
- At studio, accepts either analog or AES3 input. At transmitter end, can output *simultaneously* AES3, L and R analog. With optional DSP stereo generator, can output *simultaneously* composite baseband to a back-up analog exciter.\*

\*NOTE: Some people might want to buy CD LINK before DIGIT, Harris' digital FM exciter, because this feature allows them to have the processor back at the studio!



Radio Moves To The South Hall  
--Booth 5909



**Harris DRC1000 —  
Bringing the Benefits  
Of A Digital Audio  
Console To Radio**

The Harris DRC1000 digital audio console delivers present and future "state of the art" capabilities in a secure and reliable user friendly design. The DRC1000 provides the high level of digital sonic quality you expect, while exceeding expectations in every feature. The power of this console is all made possible by utilizing 32 bit internal precision floating point DSP technology. Each Audio Processing Unit contains six (6) Sharc DSPs simultaneously sharing capabilities to offer "awesome" processing power.

The DRC1000 uses simple, easy to read on-screen graphics, LED source la-



nels, and lighted soft keys. Users find it simple to learn and easy to use. An internal security system allows for any of the adjustable configuration screens to be "Locked Out" from users. If you want your talent to only use the faders and start stop buttons, no problem. Do you have someone who wants microphones on the right side of the console during an air shift? Digital makes it easy! Why spend hours reconfiguring your hardware? With the DRC1000's powerful software, you can reconfigure your console to match your needs in just seconds.

Each Audio Processing Unit on the DRC1000 includes 11 stereo (22 mono) AES3 (AES/EBU) digital inputs. Inputs 1 through 8 (mono) can optionally be ordered analog and work at either mic or line level. Unlike most consoles, these inputs can be named and assigned to any of the 10 Penny and Giles 100 mm throw faders.

The APU has 7 stereo (14 mono) AES3 output busses. Output busses are simultaneously available in digital and analog. Two of the analog outputs utilize 20 bit digital to analog converters for highest quality. The remaining five analog busses utilize high quality 18 bit digital to analog converters. This input to output bus structure gives the flexibility to utilize the console the way you want. Matrix configurations can be stored and changed at any time. Output matrix changes this easy offer the flexibility you need without a routing switcher. Should an application require additional routing switchers, the DRC1000 can optionally control them via serial communications.

Various pieces of digital source equipment to be used may have different sample rates. The console, by design, brings all sources together into a single audio signal. As a major portion of the digital audio stream, sampling rates must also be blended together to create the output needed to match the remainder of your digital signal stream. The DRC1000 has automatic internal sample rate conversion for each input. This console will accept 32 kHz, 44.1 kHz, or 48 kHz in either AES3 or SPDIF. Simply engage the converter for

any input that does not already match the desired output sample rate. The DRC1000 takes care of the rest. No need to buy a lot of additional equipment.

The DRC1000 offers a 5 band parametric equalizer as a standard feature. Filters include: low shelf, notch, bandpass, peak, and high shelf. You may use one or all five EQs simultaneously on any input. The console stores this information along with all of its other parameters in the user configuration. In this fashion, each user can have preferred equalization settings recalled when they use the console. Pan, compressor/limiter, and AGC are also included in the standard package. Options like reverb and pitch shift are also available.

No matter what the future holds for your operation, the DRC1000 will keep you in stride. It is designed to be expandable and to grow as you do. Today's digital products offer us new levels of efficiency never before thought possible. All of these capabilities in a reliable, yet easy to use package. Call TOLL-FREE 1-800-622-0022 today to see how the DRC1000 can improve your sound, your staff's capabilities, and your bottom line.

**Harris A2D2A— An Inexpensive,  
High-Quality  
A/D And D/A Converter That Works  
Like A Hog**



"This thing works like a hog!"

Maybe it is not the kind of quote that ends up in an advertisement, but it is how KKDA-AM/FM's Paul Strickland praises the Harris A2D2A digital converter. His Grand Prairie, Texas, station took delivery of the new A/D-D/A converter last November and he is convinced it was the right decision.

KKDA uses the A2D2A as part of a T1 STL line. The unit converts studio program audio into an uncompressed 44.1 kHz data stream, then feeds the digital signal into an Intraplex T1 digital interface. The signal is reconstructed at the transmitter site.

Other stations such as KEX-KKRZ, Portland, Ore., and WDVE-FM, Pittsburgh have also discovered the inexpensive, high-quality Harris device. Applications include standalone A/D conversion for workstations, DAT recorders and digital multitrack recorders.

The 20-bit A2D2A has standard XLR and quarter-inch analog connectors and supports both AES3/EBU and SPDIF formats. Three standard sample rates — 48, 44.1 and 32 kHz — are available and the unit can lock to an external AES3/EBU reference signal.

The front panel has been kept very simple, with two analog input controls, a stereo link button and four push buttons to select sample rate. Calibrated LED indi-

# PRODUCT Showcase

cators track input level. One front-panel LED confirms a digital signal is present for conversion back to analog.

Input impedances are 20k ohm balanced, 10k ohm unbalanced. Signal-to-noise ratio is better than 95dBFS on the analog output. The A2D2A can perform simultaneous A/D and D/A conversions and factory specs claim 100 dB of a-weighted dynamic range in both signal paths. The 1 RU-high converter weighs under nine pounds and uses a line lump external power supply. The product is certified CE ready for European use as well. Domestically, the Harris A2D2A is priced at \$599. To learn more, phone TOLL-FREE:1-800-622-0022.

*(Reprinted with permission of Radio World)*



**Orban DSE 7000FX—  
Radio's Best-Selling  
Workstation Adds Four  
Times More DSP Power**

Now, it's the DSE 7000FX! Orban has made significant gut-level changes to the best-selling workstation in radio. By going inside and adding four times the digital signal processing power, Orban's opened up all kinds of possibilities for the DSE. This new platform allows them to continually add more effects and capabilities while always keeping the ease of use that has made the DSE legendary.

Orban™ parametric equalization, Optimod™ compression, and Lexicon™ digital reverberation are now built into the DSE 7000FX. These are some of the best known names in audio processing. And although you might expect to pay thousands for such high-end studio effects, they all come standard in the DSE 7000FX.

With this new expandable platform, it'll be easy to add more and new capabilities to the DSE, all to make your job easier. As they're developed, these new DSE capabilities will come to you on a simple floppy disk, free of charge. So not only will your DSE stay current, so will your sound.

Equalization by Orban, compression by Optimod, reverb by Lexicon and the technology, the brains and resourcefulness of one of radio's most positively powerful companies... The DSE 7000FX is number one and pushing that envelope.



Once you try the DSE 7000FX, we're convinced you'll convert. That's why we'd like to offer you a demo\* unit to try. Keep it for a week and see what happens. Play

with it. Experiment. Fight over it. Just see if the DSE doesn't boost the speed of production and the creativity of spots. And see if you're ready to come on board with the best selling, best equipped digital workstation in radio. Phone TOLL-FREE 1-800-622-0022 for the full story.

\*Subject to credit approval



**Harris DIGIT<sup>®</sup> CD Digital FM Exciter  
Adds Requested Second-Generation  
Features**

Harris' DIGIT<sup>®</sup> is the world's first digital FM exciter. True CD-quality sound is only one significant advantage that has made more than 950 DIGITs the choice of broadcasters worldwide and the industry-standard FM exciter since introduction in 1993.

Now in its second generation, DIGIT<sup>®</sup> CD builds on the proven benefits of DIGIT to provide even better performance and more features!

DIGIT CD offers superb performance by using Direct Digital Synthesis (DDS) to generate an on-air signal with true 16-bit digital audio quality. DIGIT is available with either an analog input module or a digital input module which allows direct connection to digital (AES3) program sources, with no loss of digital audio quality.

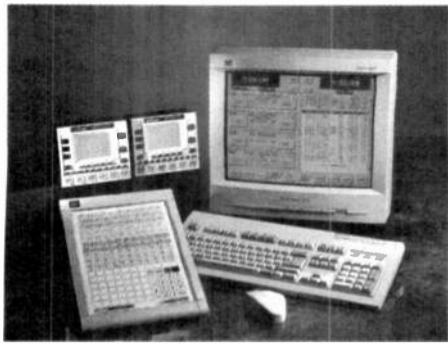
The digital input module includes a DSP-based stereo generator and a digital composite limiter (DCL). For AES3 digital audio input, DIGIT CD's stereo signal-to-noise ratio is 83dB. The DCL, an implementation of the WAVES L1 Ultramaximizer™ used by many digital recording studios, further enhances performance by using proprietary look-ahead circuitry to anticipate and eliminate overmodulation peaks before they occur.

DIGIT CD replaces the voltage controlled oscillator (VCO) traditionally used in analog exciters for program modulation with a 32-bit numerically controlled oscillator. VCO/PLL problems — for example, poor low-frequency separation and PLL unlock from audio transients — are eliminated. DIGIT CD is immune to subsonic transients that can cause faults in an analog exciter and force a station off the air. Drift-free circuits maintain DIGIT CD's original performance year after year, without operator adjustments.

For N+1 operation, DIGIT CD allows any assigned channel to be selected with no requirements for output tuning.

In addition to improved stereo signal-to-noise performance, DIGIT CD can be ordered for externally-controlled carrier frequency synchronization (GPS) capability for use in on-channel "booster" systems. DIGIT CD also includes a synchronous AM reduction circuit as a standard feature.

For more information about DIGIT CD, please fax your request to 217-222-0581 or e-mail hbd@harris.com.



**Orban AirTime™:  
More Than A Digital Delivery System...  
A Cure!**

Designed for Radio and TV broadcast, AirTime (Orban's next-generation DDS) provides all the benefits of digital delivery and gives you a computer-based solution — a better solution — to manage audio, without forcing you to undergo a painful adjustment.

You can all work the same way as before, with some welcomed improvements. For example, audio and support information can be accessed from one convenient database. With the system's built-in network, your staff will no longer have to walk a cart from studio to studio or even initiate sending audio over a network. AirTime will handle the transfer automatically.

AirTime can benefit everyone in your station or studio who uses the technology, from on-air talent to traffic and administration, from interns to veteran staff.

**A complete interface toolbox:** AirTime includes cart machine emulators, sound slate key-pads, touch screens and traditional computer workstations for live assist and automation functions.

**An old familiar face:** Your on-air talent will have no trouble using our playback cart emulator, Sound Cube. It looks and works like an analog cart machine with large lighted START, STOP and RE-CUE buttons. So training is minimal.

**Customized sound with the push of a button:** With Sound Slate™, your on-air talent can instantly call up their own libraries of intros, liners or sound effects. To play a cut, on-air talent simply calls up his or her scene and pushes the appropriate button on the Sound Slate.

**The power of Sound Screen:** You can choose a touch screen option — Sound Screen™ — that lets you run your entire operation at the touch of a finger. It's well-suited for on-air applications, but it can also be powerful tool for administrative tasks.

**For traditional control:** We also offer Sound Station™ workstations: an on-air model to quickly and easily deliver sources; a production model to create, edit, record and name sources; and a traffic model to efficiently manage all audio sources (perfect for scheduling).

Whichever option you choose, you'll enjoy the benefits of working with the AirTime system.

Load up most delivery systems with work and they'll slow down as demand increases. That's true even for systems with the most powerful Pentium processors. AirTime is an exception. Our real-time operating system prioritizes all tasks on 32 hierarchy levels, giving critical jobs such as playing audio and database sorts primary attention. So, if the system is fully loaded running month-end traffic reports and

# PRODUCT Showcase

cleaning up files, when a disc jockey or engineer hits PLAY, a cut will air instantly.

When you're ready to expand your operation, AirTime will grow with you. You can easily and cost-effectively add storage, channels, extensions and users without duplicating your entire system.

The right operating system can give a delivery system all the power and flexibility it needs to adapt to any environment. AirTime has that system: a true multi-user, multi-tasking, real-time operating system — QNX — that runs on a Pentium/PCI computer. QNX is based on UNIX, a proven, rugged operating system that can stand up to even the most demanding applications.

For more than 25 years, Orban has been the first name in broadcast solutions. As such, there's a commitment to making the digital evolution as smooth as possible for our customers, providing them with premier products and technical expertise to meet their changing needs. Give Harris a call TOLL-FREE at 1-800-622-0022 and hear more about what AirTime can do for you.



**Harris Platinum Z  
Transmitters— Finally!  
True Digital Modulation  
And  
Solid State Reliability  
At A Price Comparable  
To Vacuum Tube Transmitters**

If you've always thought you'd have to pay a premium price for solid state FM transmitters in the middle power ranges, think again.

Harris' latest generation of FM transmitters — CD Series Platinum Z — combines field-proven solid state technology and Harris' world-standard DIGIT CD digital FM exciter for the price of a vacuum tube transmitter.

Making their debut at NAB 1996 at the 5kW level, Platinum Z CD Series transmitters now are available in 2kW and 10kW models as well and can be combined for higher power applications.

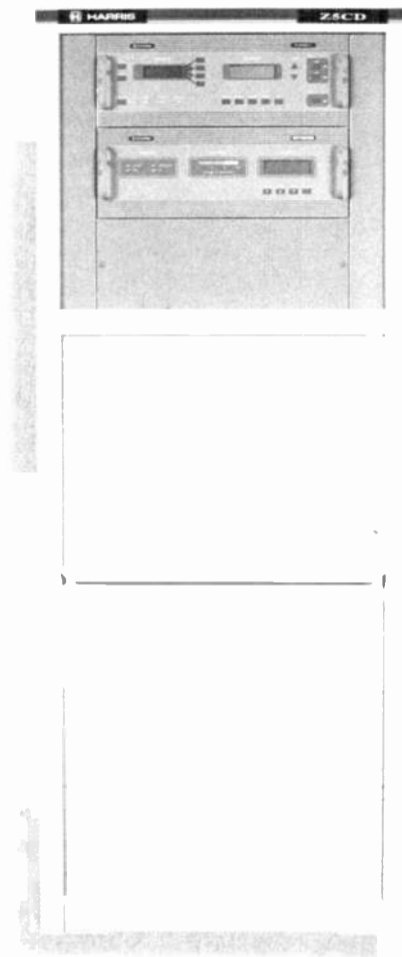
Platinum Z transmitters offer incomparable value. These ultra-reliable transmitters use the same devices that have achieved an MTBF in excess of 250,000 hours in hundreds of Platinum FM transmitters on the air worldwide. Multiple broadband 800W RF power amplifier modules operate in a parallel configuration to produce rated transmitter power.

With Platinum Z transmitters, Harris introduces a unique, patented combining system. The system — called Z-plane combining — delivers full power to the antenna even if a hot-pluggable power amplifier module is removed from the transmitter.

Reliability and on-air serviceability are

further enhanced by extensive redundancy. Among redundant components are IPAs and power supplies (5kW and above). Dual exciters are optional, and Platinum Z transmitters include built-in exciter switching.

We invite you to learn how a Harris Platinum Z CD Series transmitter can give



you the CD-quality performance your listeners demand with unmatched reliability and cost effectiveness. For more information, please fax your request to 217-222-0581 or e-mail [hbd@harris.com](mailto:hbd@harris.com).

## Don't Forget—



**Catch A Ride  
on the  
Digital Bus  
In Booth 5909  
of the South Hall!**

**CD2001, Third-Generation Harris CD  
Cart Machine, Adds AES3 Digital  
Output To Its List Of Benefits**



The CD Cart Machine®, model CD2001 by Harris — now in its third generation — has become a market leader throughout the U.S. — the world's toughest, most competitive radio market.

Now, it's ready for the world.

Why? Because DJs rely on it to start fast and play flawlessly. Because Program Directors trust the autolock feature to prevent dead air. Because management knows that the CD Cart system is the best way to keep valuable music libraries safe from peanut butter, cowboy boots, finger prints, dust, chair rollers, high heel shoes and all the enemies of "perfect forever" compact disc performance. Because engineers know a well-designed, well-built and serviceable machine when they see one. AND because the CD Cart Machine is now AES3 digital out, too. The CD2001 features a digital output with world-standard, 3-pin AES3 as well as an analog stereo output.

Still other enhancements have been made: The servo adjustment is now automatic, and the 16-bit microprocessor is now on board. Surface mount technology is used, and the certified CE-ready unit is manufactured in an ISO 9001-registered factory. It adds up to an even more reliable unit!

Of course we've kept the features that have made previous generations of the Harris CD Cart Machine so popular:

- Autolock feature prevents dead air.
- Cue to music, ready to play.
- Recognizes syndicators' Index 3 subcodes.
- Large, bright flashing EOM (End Of Message) indicator can be programmed for 5 to 35 seconds of "early warning" time before track ends.
- Track number can be preselected with track keys or jog/shuttle wheel.
- Advanced linear tracking system cuts start lag time to under 200 msec.
- Runs cooler than any other CD cart machine for long life.
- Uses industry standard CD cartridges.
- Cartridge port door keeps dust and contamination away from laser.
- Broadcast-ready XLR outputs (stereo analog, plus AES/EBU) and remote interface.
- Heavy cast aluminum deck plate.
- Vertically mounted circuit boards with optional extender cards for fast servicing.
- Top cover and servo board remove easily for cleaning.
- Floating internal mechanism enhances shock resistance.
- Rolling shafts and ball bearings at all moving points for longevity.

For more information about the CD2001, please phone the Broadcast Center TOLL-FREE at 1-800-622-0022.

# Why You Would Want An *Uncompressed* Digital Audio Air Chain And How You Can Implement One

Since the first digital radio product made its appearance nearly 17 years ago and the CD replaced the LP and tape as the quality standard, radio broadcasting has been edging toward an uncompressed digital audio air-chain. At NAB '97 with introduction of CD LINK™, a revolutionary 950MHz STL that transports uncompressed audio in a standard, 300kHz bandwidth, Harris will provide the last link in this chain. In this roundtable discussion, Harris participants discuss the benefits of CD LINK and the uncompressed air-chain, its evolution, and how broadcasters can begin implementation.

Roundtable participants include Geoff Mendenhall, VP - Radio Product Line Manager; Jim Woods, Studio Product Line Director; Daryl Buechting, FM Product Manager; Don Taylor, U.S. Radio Field Sales Manager; Dick Fry, FM Applications Engineer, and Rick Funk, Digital Studio Products Specialist.

## Q. Why would a broadcaster want an uncompressed digital audio air chain?

**Geoff Mendenhall:** Better audio.

**Rick Funk:** Compressed audio, by its nature, is destructive. It's not really the compression so much as it is the bit reduction. Bits that are thrown out in a compression algorithm cannot be retrieved. We have accepted compression because the loss is done in such a way that it's not significantly perceived by the human ear. But broadcasting, through history, has been a more perfect science than that. We've always wanted to strive for the best audio quality, so it's natural to strive for uncompressed audio.

**Geoff Mendenhall:** Broadcasters want to deliver 100% of the audio content to their audience — not the 25% that remains after compression. Better audio means freedom from artifacts while delivering 100% of the information. It also means eliminating problems associated with cascading compression. The signal only gets worse as one compression scheme takes out some of the information then another compression scheme takes more information from what was left. There's a lot of concern about that.



**Rick Funk:** Technology to this point has not offered the possibility of transferring digital audio from Point A to Point B over a standard STL without compression. The person who has wanted uncompressed audio has had to go to T-1 links.

**Don Taylor:** One value of uncompressed digital audio is that it allows you to put the audio processor anywhere you want in the air chain.

**Rick Funk:** People have wanted to put their processors at the studio, where it is very accessible for adjusting the processing parameters.

**Don Taylor:** There's an added value to having the processor more accessible. If there's a failure, the engineer can get another signal on the air much more easily.

## Q. What is the real significance of the CD LINK, broadcasting's first uncompressed digital audio STL?

**Jim Woods:** The CD LINK is the last link in the completely uncompressed chain. Now

broadcasters can "engineer" their facilities to the level they feel they need to be at from a competitive standpoint. There are no longer any technical hurdles. There still are some economic issues in the studio — for example, do you want to store uncompressed digital audio, and how do you manage that? But that's an economic issue and, consequently, a business decision. The uncompressed digital STL was a technical hurdle.

**Daryl Buechting:** As an uncompressed digital STL, CD LINK allows you to avoid compression distortions.



**Geoff Mendenhall:** It's now possible to provide a transparent, distortionless path all the way to the digital exciter, which can then convert that data directly into an essentially perfect analog RF signal. Before DIGIT (Harris' digital FM exciter was introduced in 1993 and is on air at approximately 950 sites worldwide), there wasn't a strong need or desire to extend the digital source all the way out to the transmitter. Now that we have a digital exciter that can accept AES3 data directly, it makes it much more attractive to provide uncompressed AES3 data all the way out to the transmitter.

## Q. What are the advantages of a digital STL?

**Geoff Mendenhall:** By shipping the audio out as data via STL, you have better fade margins. The product you deliver to your listeners with an analog STL cannot be any better than the signal-to-noise ratio of the STL link, and that can vary with fade and interference. With a digital STL, you either get perfect data or you get nothing, and you probably can operate at 20 to 30dB lower signal levels (or worse signal-to-noise ratio) and still get perfect audio through.

Also, you don't have to worry about hum pickup. In the case of composite STLs or other methods of transferring analog audio, you don't have to worry about affects on stereo separation because of phase shift in the transport medium. In the case of split STLs with L and R, you don't have to worry about channel matching levels, or matching preemphasis, or matching phase between L and R channels. All of those things are perfect.

**Dick Fry:** A lot of these benefits were provided by manufacturers of digital modems for analog STL equipment. There were data reduction losses, but there were still benefits of improved fade margin and better signal-to-noise ratios, so there was a market — even with an analog exciter.



**Geoff Mendenhall:** That's right. As a first step, people were willing to accept data reduction and know that 75% of their audio data would never make it on the air because they could enjoy the benefits of better fade margins and elimination of hum and level match. Now they can have all those advantages, plus they can have 100% of their audio.

**Daryl Buechting:** CD LINK drops in place of an existing 950MHz analog STL, so it's very easy to install. And it fits in the 300kHz bandwidth, the same as a composite stereo STL.

## Q. Have we heard from broadcasters who have been waiting for an uncompressed STL before aggressively implementing their digital air chains?

**Geoff Mendenhall:** That's what we've been hearing. Let me give you a little of Harris' philosophy: Why are we doing this? It certainly wasn't that we wanted to attack anyone: it was purely that we needed this product to complete the uncompressed digital air chain and accelerate acceptance of DIGIT and our other digital product offerings. Acceptance of these things has been held back because there was a missing piece — the uncompressed link. None of our vendors or suppliers have been able to provide us this product, even though we've asked for it a number of times over the years. Finally we decided to do it ourselves, because it is important to the overall 100% uncompressed path.

**Jim Woods:** This product completes a chain that allows people to make value decisions about their audio chain. If cascading compression algorithms or pure audio are not of concern, this product may not be of interest. But if cascading algorithms and the other resulting issues are of concern, then this product provides another alternative.



## Q. There are many advantages to going digital, aren't there?

**Jim Woods:** Yes. I think it allows for some very simple interconnects: it solves a lot of interface issues among various pieces of equipment and allows broadcasters to deliver the highest quality, most reliable audio.

**Don Taylor:** To piggyback, it is far easier to wire AES3 in a studio than it is to wire L and R analog pairs. You only have half the amount of wire. Plus, you don't have to worry about phase reversals, and you don't have to worry about one wire being longer than the other so that the left channel arrives at a different time than the right channel does. All of these issues just go away...

**Dick Fry:** Equalization... frequency response and degradation over long lengths of wire are eliminated by going to digital.

**Jim Woods:** In my mind, the benefit is better audio and simpler equipment interconnects. The digital chain provides high-quality audio with no signal degradation from the studio to the output of the transmitter.

**Don Taylor:** There's less risk as far as reliability and ease of installation are concerned. You take a less technical person, and that person will be far more successful with a digital installation [than an analog installation].

**Geoff Mendenhall:** That's because you don't have all the tweaks. With analog, you've got to adjust levels, you've got to avoid clipping, and you've got to get levels matched. There are consistency issues, too. A digital system gives you better audio and more consistency. The only thing you have to set is maybe two levels — on the audio processor output and on

the DIGIT input — and those levels are for both channels simultaneously. It's more of a plug and play/works or doesn't work scenario.

**Don Taylor:** It's easier to troubleshoot...

**Daryl Buechting:** ...and AES3 test equipment is available...

**Don Taylor:** ...and there no longer is the need to figure out where the Left channel left us and where the Right channel left us because it's going to be a continuous stream until the point of failure.



## Q. How should a broadcaster go about implementing the uncompressed digital air chain?

**Geoff Mendenhall:** I would start where the biggest benefits would be: I'd start at the transmitter and work backwards. There may already be digital audio sources at the studio, but still there's an analog console. However, if you replace your exciter with a digital exciter, you'll get an immediate improvement in audio. From there, go with a digital link back to the studio. At that point, you can drive that digital link with an audio processor that accepts analog audio from the studio and converts it to data. In case of the CD LINK, you have a choice of feeding analog audio or AES3 data into it. If you have analog audio from your audio processor at the studio, CD LINK will convert it to AES3 data and transport it all the way out to DIGIT in the AES3 mode. By buying just two pieces — DIGIT and CD LINK — you can make a major improvement to your broadcast air chain. Then when you get ready, you can upgrade the audio processing to fully digital and continue to work backward through the studio until you get to the source.

**Daryl Buechting:** Harris can package everything together.

**Jim Woods:** We represent digital sources from CD players to DAT. We are delivering digital consoles and expect NAB 97 to be a watershed. We represent hard disk audio systems to fit different needs — a variety of solutions from Arrakis DIGILINK products to Enco DAD to Orban DDS. We have the unique ability to bundle the digital products together to meet the customers' specific requirements. We represent high-value solutions and can deliver a competitive package to meet our customers' requirements.

**Geoff Mendenhall:** Back to the question, "Have we heard many customers say they're waiting for an uncompressed broadcast solution?" The answer is yes. I hear it all the time. I hear it at trade shows. I hear it in phone calls — that there are many broadcasters who have NOT converted to compressed STLs because they have been waiting for this solution. I believe there is going to be a huge demand. By the time we're six months out from NAB, I believe the CD LINK should be the world standard.





# UNCOMPRESSED DIGITAL STL



## CD LINK™ STL Full CD-quality sound that blows minds and blows away competition.

If you thought an *uncompressed* Studio-to-Transmitter Link was impossible in a 300 kHz bandwidth, think again. *Harris makes it economical and easy* for you to have an uncompressed bit-for-bit AES3 path that delivers rich, full, digital sound like your audience has never heard before from an FM broadcast station. Sound that can boost ratings, attract more advertisers, make your station more profitable, draw hotter talent, and start an upward success spiral that leaves your competitors singing the compressed digital blues.



**We've made history by introducing CD LINK, the world's first UNCOMPRESSED 950 MHz digital STL.**

Now the radio broadcast chain can be 100% digital, with CD-quality sound uncompromised by dueling algorithms and lossy compression schemes. Whether your present STL is analog or digital, a Harris CD LINK STL can provide AES3, left/right analog, composite stereo, one 12 kHz or two 6 kHz AUX audio channels, plus data and remote control channels.

CD LINK is another in a long line of firsts from Harris, designed to make you first in your markets. Contact Harris now for the information you need to make sound decisions.



### HARRIS CORPORATION BROADCAST DIVISION

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FAX: +1 217 224-2764



*A new world of broadcast solutions*

**Radio-FM:** DIGIT CD™ - Digital FM Exciter • SuperCiter™ Analog FM Exciter • CD LINK™ Digital STL • Quest, Platinum and Platinum Z Solid State FM Transmitters • HT Single-tube FM Transmitters • FM Antennas **Radio-AM:** DX - Digital Solid State AM Transmitters • GATES® Solid State AM Transmitters **Radio-DAB:** DAB 2000 Transmitters **Studio Products:** Digital and Analog Studio Equipment **Systems:** Mobile and Fixed Studios and Satellite Systems

## Harris Staffers To Present Six Papers During NAB 1997 Engineering Conference

Harris staff members will present six papers — five on understanding and implementing new digital technologies and one on planning for continued on-air operation in emergencies — during NAB 1997. Copies of any of Harris' papers are available by sending your written request via fax to 217-222-0581 or e-mail to hbd@harris.com. The line-up follows:

**Designing and Building the Digital Studio Facility - A Nuts and Bolts Approach**  
by Gary R. Hardwick, Sales Specialist



Is the punch tool a thing of the past? What is required to upgrade an existing facility to incorporate digital technology? What are the key considerations in planning the digital studio for the next decade and beyond? This paper answers these questions — and more.

**Performance of Modern AM Modulation Methods into Varied Antenna Conditions**  
by John Delay, AM Product Manager, and Hilmer I. Swanson, Senior Staff Scientist and winner of the National Association of Broadcasters 1990 Engineering Achievement Award



With the demands of today's broadcast formats and potential for future digital broadcasting in the AM band, it is more important than ever to understand different modulation techniques and their performance under varying antenna conditions. This paper compares the performance of digitally modulated transmitters and PDM transmitters under a variety of conditions.

**Advances in Digitally Modulated RF Systems**  
by Tim W. Dittmer, Manager of Radio Engineering



This paper will examine several digital modulation techniques that are used to modulate RF carriers. Digital modems designed to upgrade analog RF systems will be compared to RF systems designed from the ground up to digitally modulate RF carriers. Additionally, systems using source compression algorithms for data reduction will be discussed and compared to uncompressed systems.

**Planning Your Digital Television Transmission System**  
by Robert J. Plonka, Principal Engineer



A fundamental requirement for planning a digital TV system is to determine the transmitter power rating as it relates to the FCC 6th NPRM allocations table. This paper discusses the peak to average power ratio in 8-VSB transmitter systems and its relationship to transmitter power ratings and linearity issues. Two other areas covered are 1) accommodating an adjacent DTV channel, and 2) frequency coordination.

**Implementing Digital Television: WRAL Case Study**  
by David C. Danielsons, Principal Engineer



This paper documents the installation and test of WRAL-HD in Raleigh, North Carolina, the first commercial DTV station on the air. Topics include transmitter installation and initial check-out, transmitter setup and performance with NTSC, IOT tuning for the 8-VSB ATSC signal, power calibration of the transmitter using a liquid cooled glycol system, and "on air" transmitter performance with the DTV signal.

**Staying on the Air: Case Studies in Emergency Planning - Radio/TV,**  
by David C. Kobe, Manager, Broadcast Technology Training Center



Transmitter hardware is evolving rapidly with changes that often involve breakthrough technologies. In fact, many stations are losing ground and lack a comprehensive plan to cover emergencies. This paper compares emergencies that have turned into disasters with emergencies that have been handled effectively. Are you prepared to meet the demands of digital and microprocessor technologies, solid state, and surface mount technologies? And what impact will future technologies have on your operation?



**Don't Forget To Catch The Digital Bus to Harris Booth 5909 In The South Hall!**

## How And Why Should You Convert To An All-Digital Studio To Transmitter Path?

by Geoff Mendenhall, VP- Radio Product Line Manager

The acceptance of the AES/EBU serial digital audio data interface standard by all the major broadcast equipment manufacturers makes it possible to build an All Digital studio with an All Digital link to the transmitter using standard off-the-shelf equipment.

The AES3 (Audio Engineering Society/European Broadcast Union) serial data standard is defined in AES3-1985, ANSI S4.40-1992 and AES3-1992 documents as the digital audio data format to be used as the interface standard for audio sources, mixing/control equipment, audio processing equipment, STL equipment, and transmitter inputs. The European Broadcasting Union has republished a standard which is identical to the AES3 standard, except for the use of transformer coupling. Some highlights of the AES3 data format are:

- The interface format can accommodate 16, 20 or 24-bits of digital audio information.
- The interface handles serial data transmission of two channels of digitized audio over a conventional shielded, twisted-pair wire, for distances up to 100 meters.
- The interface uses standard 3 pin, XLR-type connectors, carrying balanced, RS-422 compatible signals that are polarity independent. The input and output impedance for the interface is 110 ohms.
- The data is sent least significant bit (LSB) first, with alternating subframes for Channel 1 and Channel 2.
- The data is self-clocking, and does not require an additional CLOCK connection to synchronize the source and destination.
- Auxiliary data bits are available to transport system control information along with the audio data.

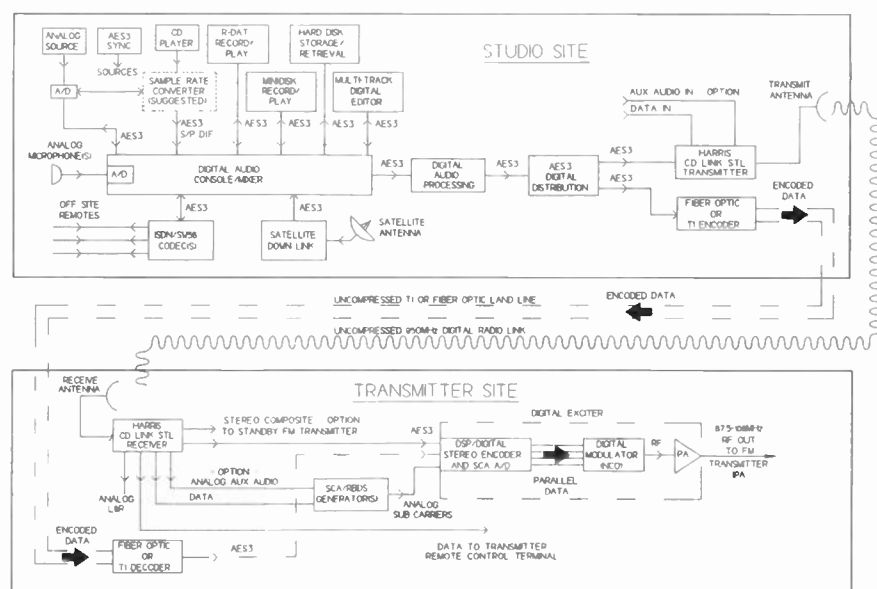
Standard AES3 transmit and receive chipsets support the three commonly used data rates of 48.0kHz, 44.1kHz, and 32.0kHz. Since the current FM stereo transmission standard limits the frequency response of the left and right channels to a maximum of 15kHz, a 32kHz data rate is often used.

The AES3 output from the studio console can be distributed to other locations including the transmitter site. Two common ways to deliver the AES3 data are either through a digital STL radio link or through a T1 digital telephone line. Digital STLs and Digital STL modems (used to upgrade analog STLs) are now available. Analog phone lines are being replaced by T1 digital phone lines capable of carrying high data rates. A new generation of digital audio processing equipment accepts a digital audio input, processes this data fully in the digital domain, and outputs this processed data without any analog to digital (A/D) or digital to analog (D/A) conversions. There are many advantages to using an All Digital path to your transmitter over discrete analog or baseband transmission. The advantages of an All Digital path include:

1. The elimination of all intervening A/D and D/A conversions and the distortions they introduce.
2. Full digital quality delivered to the "On-Air" signal without the noise and distortion build-up of an analog system.
3. Plug and Play - easy interfacing between equipment without worries about level adjustments or hum pickup.
4. Absolute frequency response and amplitude matching between stereo channels.
5. Absolute phase matching and differential phase stability between stereo channels.
6. Absolute stability and repeatability day-after-day, year-after-year without adjustments.
7. Resistance to interference
8. Greatly improved fade margin for radio links.
9. Half the cable population - one AES3 cable replaces two analog cables.
10. Ability to transport some auxiliary control data along with audio data on one cable.

Harris offers a full range of AES3 compatible equipment including the revolutionary CD LINK uncompressed STL and the industry leading DIGIT® CD digital FM exciter to make the transition to a full digital air chain easy.

### THE ALL-DIGITAL UNCOMPRESSED PATH FROM PARALLEL TO TRANSMITTER



# The New Harris Uncompressed Digital STL

By: Andy Laird

Vice President, Engineering/Radio Group  
Heritage Media Corporation

## BACKGROUND

The improvements in CD players, audio console design, audio processors and digital FM exciters have, in my opinion, made the 950 MHz STL system the weak audio link in the broadcast audio chain. True lossless or non bit rate reduced digital systems are available for T-1 and at the 23 GHz bands. And these sound great! But my experiences at 23 GHz have been very disappointing from a reliability standpoint. T-1, on the other hand, is reasonably reliable but you have to pay for the circuit every month. Presently we use lossless T-1 equipment at seven of our stations where single hop 950 MHz systems are not possible and/or where a backhaul from the transmitter site is needed. These STLs truly sound better than any of our 950 MHz composite systems. They also sound better than the two 950 MHz systems we have operating with compressed digital encoders/decoders. Why is this?

The digital systems currently available for the 950 MHz band use bit rate reduction, most commonly four to one. This is presumably necessary to reduce the transmission bandwidth to fit into a 950 MHz STL channel. This is called perceptual coding. Perceptual coding works because of the inability of our hearing to notice certain details (they are masked) while other distracting audio events are taking place. The perceptual coder throws away the data that it thinks will be masked by our hearing. It's my opinion that typical broadcast audio processing unmasks the perceptual coding, making the bit rate reduction audible. Additionally, the stacking of different types of bit rate reduction used in distribution systems (such as satellite, ISDN and dial-up), with those used in floppy and hard disk storage systems, and then shoving all that through an additional round of bit rate reduced STL, creates even worse sound than can be imagined just by listening to each element on its own.

## CONTACT

So, when Geoff Mendenhall of Harris Corporation called and asked if I would be interested in evaluating a new 950 MHz band STL, I was very interested.

After signing a non-disclosure agreement, I found out that the system was uncompressed 16 bit linear digital using no bit rate reduction, the same as the T-1 systems we like so much. And on top of that, the transmission will fit within an existing 300 kHz 950 MHz channel and have two RS-232 ports in addition to auxiliary audio channels. Seemed like magic to me. I wanted to see it and hear it in operation. Subjective judgments of audio quality would be made, compared to our favorite T-1 system.

## PLANNING

The Heritage FM station WAMG was convenient for this comparison. The main STL is a T-1 circuit using an Intraplex lossless digital system. The station plays "soft favorites" which include some newly recorded music. The main T-1 STL consists of an Intraplex encoder/decoder system. The Intraplex system provides L and R audio out into an Orban 8200 processor. The AES/EBU output of the 8200 is fed to the main transmitter's DIGIT<sup>®</sup> exciter.

## THE TEST SET-UP

For the evaluation, we compared the audio quality of the uncompressed digital 950 MHz system operating closed loop into a dummy load with the "on air" T-1 system.

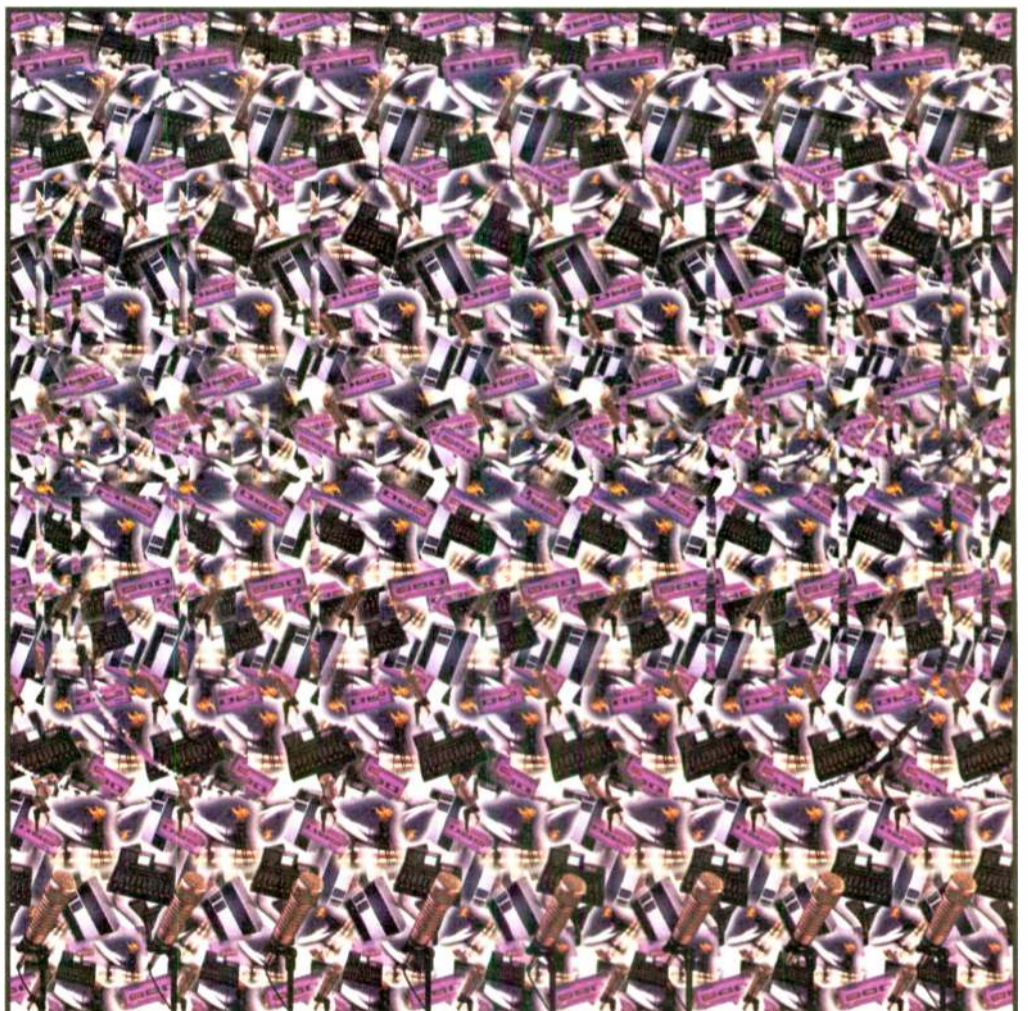
Occupied bandwidth: Terminating the output of the transmitter through a 20 watt 50 ohm attenuator, then through a precise step attenuator, the output was connected to a spectrum analyzer. The RF spectrum does not look like the "hay stack" that you would normally see from 950 MHz equipment. The energy distribution is very flat across the top and falls off almost vertically at the edges of the channel (300 kHz). It looks more like stacked hay bales as opposed to a hay stack. The cut off on either side of the 300 kHz is very sharp. The total occupied bandwidth of the digital STL fits into a standard 300 kHz, 950 MHz channel.

Fade margin: The attenuated output of the transmitter was removed from the spectrum analyzer and coupled into the receiver. We adjusted the step attenuator feeding the digital STL receiver to provide about the same 200 microvolt signal level being delivered to the backup analog STL. The output was then reduced with a precision step attenuator until just where the error correction circuitry began to operate. This was around 10 microvolts. As the signal level was reduced to 5 microvolts, the receiver muted. We measured about a 30 dB fade margin before receiver mute. The error correction circuit worked very smoothly with no clicks or pops down to the mute point of the receiver.

Operation and Diagnostics: The front panel LCD display provides a full array of operating parameters and membrane control buttons. In addition, several diagnostic tools are included to troubleshoot problems. The receiver also stores a history of error corrections.

## CONCLUSIONS

We heard no difference between the T-1 system and the uncompressed digital STL system. Comparing music or voice revealed no sonic differences between the two systems. This did not surprise us since both the T-1 system and the new Harris digital STL transport data that is "bit for bit" identical at both ends of the link. Frankly, I was knocked out by the total performance of the system. There is no doubt that the system passes audio quality that Heritage stations have only been able to achieve through the use of non bit rate reduced T-1 systems. In addition to the audio, the system has the promise of greatly improving STL band congestion problems. The first adjacent channel rejection of the system will allow you to use two adjacent channels from the same transmit site to the same receive site with no interference. I think the future is looking very bright for Harris' new uncompressed 950 MHz STL.



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# Studio Sessions

**NPR Acquires  
Media  
Superpower  
See Page 59**

Radio World

Resource for Radio Production and Recording

April 2, 1997

## Penny + Giles DSP Is a (PP-)10

Patrick Stapley

Mention the company Penny + Giles and most people naturally think "faders."

However, P+G is also an aerospace company with a long history of developing digital systems for aircraft and satellites.

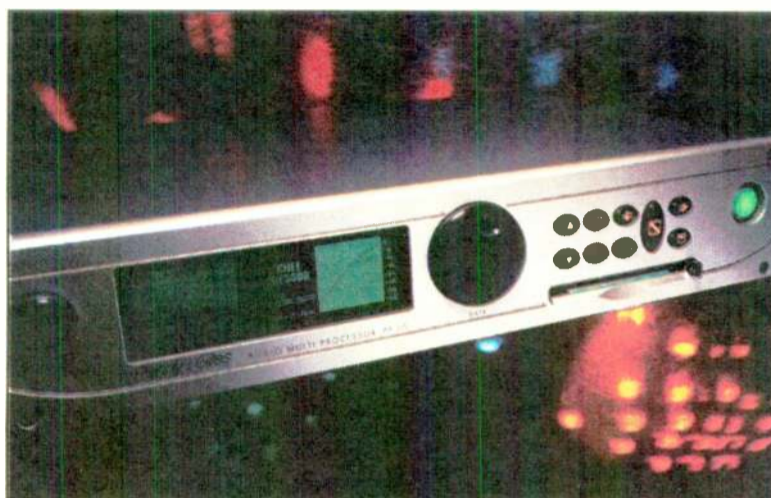
Armed with this knowledge, we find it no great shock to learn that P+G is entering the competitive world of digital signal processing (DSP) with an innovative new system.

### Cosmetic styling

The Audio Multiprocessor was launched last April at NAB '96 where it won an RW "Cool Stuff" award. Since then, the Audio Multiprocessor has taken center stage at P+G exhibits at a number of pro audio shows.

The system represents a radically new concept to the professional audio market — a software-based approach capable of achieving a myriad of signal processing possibilities.

The system should be viewed as two components: the hardware and the



The Software-driven PP-10 From P+G

Pythagoras software.

The hardware component consists of either the PP10 with front-panel controls, or PP20 with optional remote controller and expansion frame. The software, supplied on floppy disk or pre-loaded, offers different processing sets and makes up the other half of the system.

As of press time, processing choices were limited to EQ and Dynamics, available separately or combined in the "Studio Package."

A Mastering Suite package will be available shortly, followed by a SurroundSound package. Reverb and delay software also should be available soon.

The PP10, as the system is generally called, was designed with absolute flexibility in mind. A single unit handles up to 16 discrete ins and outs, providing that the full complement of I/O modules have been fitted.

In addition, individual processors can be chained together in single sig-

nal paths or used to process multiple channels. All the processing occurs in the software, so the only restriction is processing power.

The PP10 has a steep learning curve. Although familiarity does come with time, be warned: This is not a unit for the faint-hearted or those looking to dial in a quick fix.

The device can be fitted with both analog and digital AES/EBU and S/PDIF stereo I/O — the standard configuration being one stereo digital I/O.

Analog I/O may be supplied with either standard 20-bit AD/DA converters or optional 18-bit converters.

Internal processing is 32-bit floating point, which P+G says achieves an operating headroom in excess of +700 dB and noise floor of -144 dB.

Digital output can be set between 24 bit and 8 bit using simple truncation, noise shaping or dithering, while supporting sampling rates of 44.1 and 48 kHz. It is very possible 96 kHz may be available in the future.

Chunky front panel controls were kept to a minimum, resulting in a group of icon-inscribed oval buttons, a very stiff rotary level control and large data wheel.

The display is a backlit LCD. Much of the information is graphical, covering signal path configuration, metering, processor curves and a DSP "power gauge."

Also on the front of the unit is a floppy drive enabling software to be loaded into the PP10 or simply run directly from the floppy.

Oddly, signal paths are assembled in

See P+G, page 53 ▶

## Jingle Jumble: Who Is Real Owner of PAMS?

Alan R. Peterson

A settlement has been reached in the issue of who owns PAMS jingles.

The company — famous for creating legendary jingle packages for stations including WABC(AM), WLS(AM), KFWB(AM) and hundreds of others around the world — suspended operations in 1978. When the "PAMS" registered name became available, it was registered again by Ben Freedman of CPMG Inc.

Freedman, along with associates Ken R and Ricky Kaufman, has been the source of PAMS jingles from 1981 through 1996.

While the name alone was held by Freedman, all stock in the original PAMS corporation was later researched and acquired by Jonathan Wolfert, president of JAM Creative Productions.

In 1996, after discussions and a number of exchanges, Wolfert filed a lawsuit to force a legally-binding resolution. At stake was the issue of who could legally do what as PAMS.

As a result of the settlement, all parties agreed that PAMS Productions — owned by Wolfert — is the owner of all copyrights associated with the original PAMS jingles. PAMS has compensated CPMG for the PAMS trademark

and rights to the PAMS "re-sings" that were recorded by CPMG. Terms of the settlement were not disclosed.

In a joint press release announcing the settlement, Wolfert stated, "My main focus will continue to be creating new and innovative ID packages for JAM, but I am glad that we will now be able to offer interested clients re-sings of many classic PAMS jingles as well."

Freedman was "delighted" to have reached the agreement and plans to devote his time to Ben Freedman Productions, a division of CPMG. He said, "In addition to creating new contemporary packages, Ben Freedman Productions will continue to make available re-sings of classic Gwinsound jingles," referring to another top producer of ID jingles during the 1960s.

Through a special licensing agreement, PAMS material will continue to be available through Ken R Inc., which acquired most of the original PAMS masters and reference tapes in 1980 and was responsible for most of the re-sings produced through 1996.

Ken R told RW, "I'm glad we could all work this out and still stay friends. I communicate with Wolfert almost on a daily basis by e-mail. I look forward to continuing to market and have fun with the PAMS tracks."

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## PRODUCT EVALUATION

# Sony: Multitracking on MiniDiscs

Alan R. Peterson

Sony developed MD technology and watched it grow in interesting ways. While the format did not ignite the consumer world, MD found uses in radio studios as a fast and easy recording medium and cart replacement. In the field, an MD recorder brings the story back alive with digital clarity and no tape dropouts.

Now Sony has introduced the MDM-X4 multitrack recorder, a device intended for musicians and small-scale production uses. The MDM-X4 places four tracks of near-CD quality audio onto a Data MD and runs circles around analog cassette-based multis.

Before you get frantic over the term "near-CD," don't worry. For all the ill press data reduction has endured, the process sounds fine and for radio, you really cannot detect the difference. Remember how much of your work was once done on hand-me-down analog tape from the PSA box?

The MDM-X4 should surprise you, and the \$1,250 list price places it in the realm of some of the upper-end analog cassette multis while outstripping their performance.

Several companies are now making portable, self-contained multitrack MD recorder/mixers. Yamaha, Tascam and Sony all distribute their own versions, each with a unique set of features.

For instance, on the Yamaha deck, the MD is inserted into a small pop-up mechanism which is closed to engage the disc — much like the lid on a top-loading cassette deck. MDs are inserted into a slot in the Sony, where a little motorized drive grabs the disc halfway in and safely delivers it to the optical reader. Quite a nice surprise if you don't know it is coming.

Play and Stop buttons are large on the panel and the Record Arm button is recessed and lit brightly when pressed. Random access to the MD is done with a pair of Skip buttons and a combined Jog/Data happy-wheel. Four Rec Select "Chiclet" buttons arm the tracks on which you wish to record.

## In easy reach

The ergonomics of the transport controls are pleasing. All necessary functions to operate the machine are clustered around the happy-wheel, within easy reach.

This is a trend I am beginning to enjoy. Digital technology has removed the mechanical need to place switches and controls in locations friendly only to the manufacturing process or steeped in "that's-the-way-we've-always-done-it" history.

The Tascam MD recorder and the 360 Systems ShortCut are two other shining examples of this movement.

The mixer section of the MDM-X4 features several two-position selector switches to assign either mic/line signals or Track Play to faders 1 through 4. An extra fader marked "5-6" takes on a set of stereo inputs, and two Aux Send busses handle effects routing.

Each input has a level trimmer, and faders 1 and 2 can also handle low-Z balanced mics or line inputs. Connectors are all quarter-inch phone jacks, with combined phone and XLR jacks on

inputs 1 and 2.

I found the mic preamps a little noisy when monitoring the MDM-X4 with headphones, but in all fairness, I had the preamps cranked entirely too high. Set your levels with this in mind.

Speaking of noise, the Sony MDM-X4 has a tiny fan next to the MD slot.

You may find mechanical noise from the fan and the MD drive motor to be objectionable, but it

was a non-issue for me. Like most folks that produce for radio, I have a noise-gating mic processor and gobs of sound-absorbing stuff in my workspace. The MDM-X4 is certainly less noisy than what you have been using in the past, and is much quieter than a computer.

A pair of MIDI jacks on the back panel of the MDM-X4 ties the unit to a larger system, allowing synchronization with a MIDI sequencer. Code recognized by the MDM-X4 includes MIDI Clock, MIDI Time Code (MTC) and machine control data. The latter allows deck transport control directly from the MIDI sequencer.

I didn't see it anywhere in the manual, but this may potentially allow several MDM-X4s to sync and function as an eight-track or larger rig. As long as each deck has a different Device ID (Dev ID) setting, it may be possible. I have not tried it.

## Recording

Plug what you like for audio sources into the MDM-X4. My own tests included mic, CD Walkman (plugged into the channel 5/6 fader for stereo control), a Roland Boss VT-1 voice processor, direct-injected electric guitar and Yamaha TG-33 synthesizer. A dbx Project 1 stereo compressor tamed the mixdown.

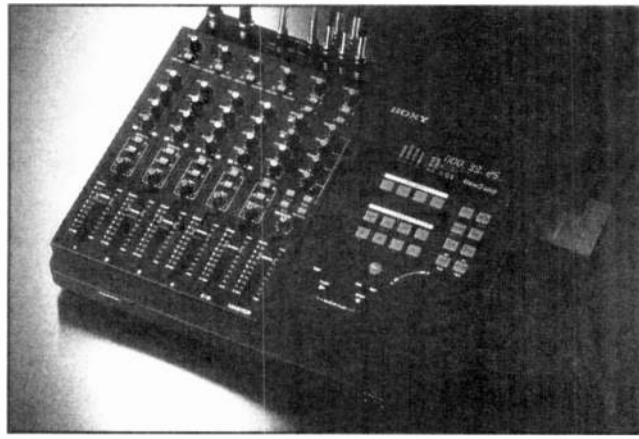
Being a digital device — and you would be hard-pressed to find a bad-sounding one these days — the MDM-X4 recorded everything cleanly and in good detail. The three-band EQ provided cut/boost at 50 Hz, 2.5 and 15 kHz. For work done specifically for radio, that upper-end may not add much, especially on AM production. Still, it is there and it is useful.

Track assignment is by a pair of buttons on each input strip, much like any four-bus board. To place a signal on track 2, press the 1-2 button and pan hard right. A monitoring strip is located over the Master Fader to monitor previously recorded tracks for overdubbing.

The Pan controls did not do much for me. Panoramic shift did not really become obvious until well into each pot's travel — about 9 and 3 o'clock.

A nifty feature called Mix Write comes to the rescue when tracks run low. It is possible to record on top of a track and combine a new performance with the old without erasing the original work. Similarly, ping-pong recording can be done this way to collapse four tracks down to one, opening up space for new material on the first three tracks.

Be warned that this is not the same process as used in hard disk recording



The Sony MDM-X4 MiniDisc Recorder

and editing. Theoretically, digital mixdowns can go on forever inside a disk drive with no loss of quality, but the MDM-X4 passes audio back through the mixer section and the success of this process rests heavily on your ability to ride gain. One bit of clipped audio that gets by you early on is there for the rest of the recording and only gets uglier with each pass.

## Play yer guitar

My own evaluation of Mix Write was done by recording the song "Under the Double Eagle," a.k.a. the "Six-minute Workout Theme" from Westwood One's syndicated Greaseman Show. The MDM-X4 allowed me to pile 16 guitar tracks together before the mix began getting out of hand.

Naturally, when restricted to four tracks it becomes necessary to plan your track allocations before you begin. For smaller projects, this is not a problem.

The happy-wheel comes in handy when lining up locations for punch-ins and editing. And on that topic, it is possible to do rudimentary Move and Copy functions on the MDM-X4, similar in nature to hard disk editing.

Go to the Edit menu (a button clearly marked EDIT) and use the happy-wheel to select "Trak Copy," "Trak Move" or "Trak Xehnge."

The happy-wheel is then used to locate and highlight the block of audio you wish to affect. Press Enter and the MDM-X4 performs the function.

The process is not *exactly* like hard disk, inasmuch as the Move function locates audio to a new track and there is no waveform editing; you have to do it by ear and by the numbers in the display. The Move function is more like a "relocate" feature than the genuine click-and-drag timeshift abilities native to a random-access DAW. Location accuracy is to 1/30th of a second, or one frame.

## Lots of names

The happy-wheel also lets you name your cuts by "spinning in" each letter of the name. The MDM-X4 presumes your projects are called Songs — after all, it was primarily designed as a musician's device — and lets you name up to 255 pieces. So long as you do not exceed 148 minutes total time per disc (or 37 minutes per track total), you can fit as many cuts as you wish up to this limit onto a single Data MD.

Cueing audio with the happy-wheel is not like a DAT or a CD, nor does it resemble the characteristic "voot-voot" sound of tape scrubbing. The MDM-X4

plays back tiny, recognizable chunks of sound at real pitch when searching for a desired location. An easier way to search for an edit point or cue is to drop a locator marker with the Mark button and keys A through H.

## Is it for you?

The fact that three major companies are making MD multitracks says a lot about the format. It sounds better than cassette multitrack ever did, runs smoothly and is as familiar to use as any portable multi that has been available for the past 15 years.

And while some say it isn't important, audio producers enjoy having a tangible medium they can hold, load and catalog (and presumably lose). MD satisfies this primal psychological urge.

A device such as the Sony MDM-X4 would not be first choice for a station's "money room," but is an excellent choice for the jock looking to do bits and production at home.

Similarly, the fledgling "liner guy" or comedy producer looking beyond tape production to equip that first or second studio would find this a good product to work with.

The other option is hard disk recording and editing, but workstations can be more expensive and offer closed-ended storage in exchange for editing power. PC-based workstations are powerful, but after you have decided on a software package, soundcard, external mixer and other options, the expense curve has gone sharply upward.

If you can live without the ability to "nudge" music cuts to the millisecond and enjoy working with real live faders and EQs instead of mice, again look to the MDM-X4.



And if you have ever tried to bring a PC with you somewhere and attempted to record four tracks simultaneously, you will quickly appreciate the beauty of a fully-portable multitrack.

You won't be able to buy Data MDs at the corner pharmacy, but they are available at computer dealers and on special order at office supply houses.

If your broadcast dealer doesn't carry them yet, ask them to. Their recording media sources can set them up. Remember, multitrackers require the Data variety of MD. Conventional MDs will only give you two tracks.

The only way to know if an MD multi-

**Product Capsule:**  
**Sony MDM-X4 MiniDisc Multitrack Recorder/Mixer**

 <p><b>Thumbs Up</b></p> <ul style="list-style-type: none"> <li>✓ Novel use of MD</li> <li>✓ Versatile mixer section</li> <li>✓ Editing ability</li> <li>✓ User ergonomics</li> </ul>	 <p><b>Thumbs Down</b></p> <ul style="list-style-type: none"> <li>✓ Limited pan</li> <li>✓ Uses MD Data discs</li> </ul>
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For more information call Sony at (201) 358-4196, or circle **Reader Service 135**

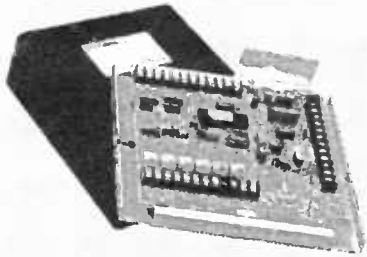
track is right for you is to try one. If you are used to cassette-based multis, the fidelity of MD will surprise you. And if you are not ready to leap directly into the complexities and expense associated with PC-based multitracking, the MDM-X4 is a suitable unit you will continue to use beyond that of "transitional format."

Besides, the thing is a hoot. Try it out for yourself.

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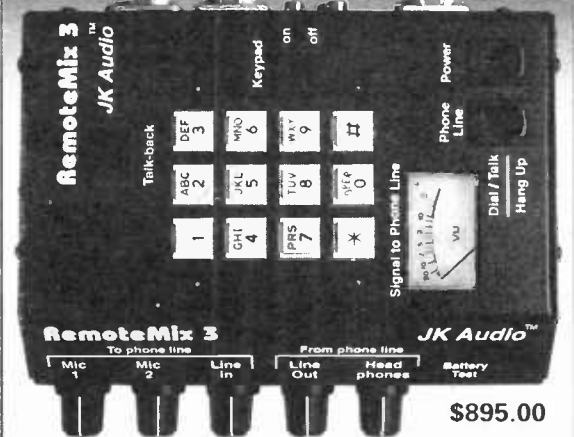
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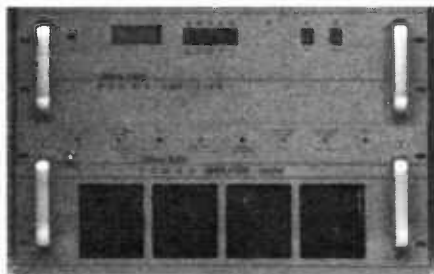
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### B-600

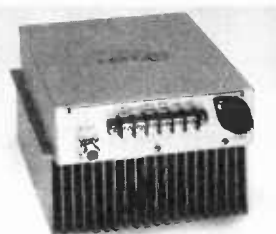
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.....



# P+G Digital Processor

► P+G, continued from page 49 reverse order on the LCD, working from the output back to the input. Each attached module can assume any DSP function offered by a particular software package and can be changed at any time. For example, a three-module chain could consist of a three-band EQ, a noise gate and brickwall limiter.

The PP10 potentially offers a complete outboard rack in a single unit. The capabilities, of course, will expand as further Pythagoras software packages become available. It might also be useful to interface the system via MIDI to a digital controller to provide simultaneous real-time access to parameters.

### Comprehensive range

In addition to the comprehensive range of processor types — such as multiband EQs, gates, a hyper-compressor, expanders, duckers, clippers and so forth — a range of mono/stereo routing and mixing processors are also included, along with a selection of ready-made factory presets.

## The presets cater to a variety of specific functions for creating.

The presets cater to a variety of specific functions and can offer good starting points for creating personalized settings. User presets can be stored to RAM or diskette and can contain individual processor settings or complete multi-processor patches.

If the system falls down on its ergonomics, it certainly makes up the difference in terms of facilities and overall audio quality. Users will be hard-pressed to find EQ or dynamics processing that does not suit even the most individual or demanding of applications.

Even vociferous detractors of this type of digital processing cannot help but be impressed with the performance of the PP10 and its natural sonic clarity.

Although a fully specified audio multiprocessor is not cheap, and additional software packages must be bought and paid for, the ability of the system to perform as a virtual rack and patchbay with an expansion path makes it an attractive option. It just remains to be seen whether the somewhat alien exterior of the PP10 will give way to the system's heart. I hope it does.



For information, contact Penny & Giles, (310) 393-0014, or circle Reader Service 101.

Patrick Stapley is a freelance pro audio journalist and recording engineer based in Blackwood, England.

### SHORT TAKE

# New Miller Mini-book on Mics

Franklin J. Miller — king of the five-dollar booklets — is back again with another handy 30-pager called "Mic-Splitting Demystified: Understanding the Process."

Miller states in his foreword that the book is not a how-to manual, but a detailed explanation of the principles behind the mic-splitting process.

Even with today's digital circuitry and high-tech ways of doing the simplest things, the classic isolation transformer remains the best way to perform mic splitting. Indeed, Franklin's professional background includes audio transformer design and manufacture (he founded

Sescom Inc.), so he is well-qualified to describe the process.

Franklin explains how hum can get across a transformer box in the sneakiest ways, and how to provide a phantom power connection across a transformer (DC cannot go through a transformer, remember?). He briefly gets into active and passive circuitry and explains why incorrectly terminating a transformer smears frequency response.

The booklet does not talk you through troubleshooting your audio rig, but it does skim the basics hard enough to tell you where to look and why.

There is more than a passing mention of Sescom transformers, and several typos sneaked through the proofing process (like *Switcherat* and *because*). But as with Franklin's earlier efforts, five bucks spent here is better for your career than blowing the money on a burger and fries at the drive-thru.

Franklin publishes, prints and staples his volumes himself, and you have to order your copy directly from him. Write him at 2100 Ward Drive, Henderson, NV, 89015-4249.

— Alan R. Peterson

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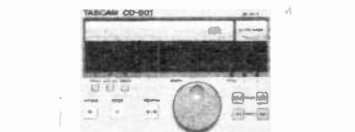
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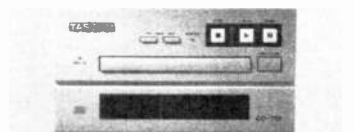
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# Soundcard Maker Presents XTrack

Val Davis

A few months ago I was fortunate enough to review the Digigram PCX-11 audio card. It would be an understatement to say that I was most impressed with that device.

Shortly after the review I was asked to review Digigram's XTrack multitrack recording software. I responded so quickly that I think I pulled a few muscles.

XTrack is a proprietary software package that will work only with Digigram audio cards. This is an easy-to-use, power-packed piece of software with all of the editing features producers desire the most. If you enjoy working on analog 16- and 24-track machines, as I do, you are really going to love this.

## Setup

The initial routine involves setting up the recording session, which means choosing your settings (sample rate, et. al.) for the recording. XTrack uses a Title that represents the session. It can be one track or 32; the system lets you add tracks as needed during the recording process.

Your settings will determine how much audio can be recorded to your hard disk. If your settings are mono with a 48 kHz sample rate and 128 kB/sec bitrate, you will be able to record up to 60 hours of audio on a 4 GB hard disk. A 256 kB/sec bitrate would decrease your time to 30 hours.

Now that you have set up your title, you are ready to record. This is where XTrack really shines. Many other systems I have used are really tough to learn. I am certain they make perfect sense to a programmer, but they confuse an old studio junkie like me.

XTrack looks and operates just like a studio console and remote for a multitrack tape machine. There are faders for each of the inputs and outputs. If, like me, you are working on a card with just two ins and outs, the mixdown is virtual to two tracks.

In addition to the input and output faders, there are also Mute, Solo, Track On and Off and EQ features. The EQ is three-band parametric, and works just like the old API consoles I used to love so much.

## Taking command

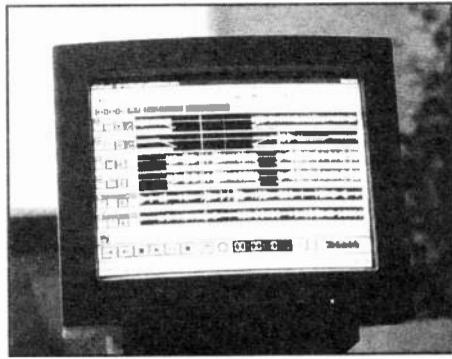
The "Command Panel" is your recorder remote control and it does everything imaginable. Features here include scrubbable Fast Forward and Rewind, Stop, Play, Cue (plays from a marker), Record Enable, Loop, Jog Wheel (freestyle scrub), Counter Position in HH:MM:SS:FF and Autolocator.

In addition you can set markers to allow instant access to a particular section of audio. You might use this to rehearse a punch or to lay down multiple parts in the same section of the recording.

You can choose how much of the audio timeline appears on the monitor, be it 30 seconds or 10 minutes, viewable at any one time. You can also select the number of tracks you want displayed at any one time. To the right of the track are the controls for that particular track, including volume fader, mute on/off and EQ.

Let's say you have just recorded a voice part in a two-voice dialogue. You can see the noise present during the silence between the speaking parts. To eliminate "room noise," highlight the "in-betweeners" and delete them.

If you have a sound effect that you would like to be heard more than once,



The XTrack from Digigram

highlight it, copy and paste it where ever you want it on the time line. This makes editing remarkably easy, which brings us to our next topic: editing functions.

As you well remember, editing audio once meant taking a razor blade to a piece of tape and cutting out some sections, inserting something else and taping it back together with splicing tape.

Editing with Xtrack gives you a lot more capabilities. It is possible to copy, paste, insert, cut, move, and, in general, manipulate audio all you would want without damaging the original product. Highlight the area you want to work with, then apply a function to that segment. This allows vocals to be doubled, noise to be removed, and sections to be copied and repeated.

Advanced editing functions of Xtrack include Stretch, which allows you to increase the duration of an audio segment without increasing the pitch. The "Pitch Shifting" function allows me to raise the pitch of my voice without speeding up the read.

Noise reduction is also available. Highlight the noisy section, gather the statistical data on the noise then zap it. This function takes time on larger sections, but works flawlessly.

All edit functions are non-destructive. Every time an edit is executed, Xtrack saves the file in the previous form. You can "undo" back through several edits to

the original form. This feature is great and saves a lot of frustration.

## Auto-mixing

Once you have completed your multitrack recording, several handy features are available to you. Automated mix-down allows you to set levels for individual tracks at different points in the mix. When it is time for the guitar lead, it comes up and then goes back down for the vocals to come back in.

Automated mixes are useful when constructing complex audio productions. These automated mixes are facilitated further through the use of "blocks." Blocks can be one or more tracks grouped together so they can be controlled together. Leveling is also available to create a median level in the mix. Mixing with Xtrack is a joy.

■ ■ ■

Obtain information on Xtrack and the Digigram line of audio cards from Cate Cowan at Cowan Communications, (202) 429-5379, or by circling Reader Service XX. You can also learn more by visiting the Digigram company website at <http://www.digigram.com> Val Davis can be contacted at [vdavis@nerds.com](mailto:vdavis@nerds.com)

## DIGITAL DOMAIN

# Data Blazes With FireWire Model

Mel Lambert

While preparing a couple of recent feature articles for RW, I had reason to reflect on the one major technical parameter that seems to be holding back the radio industry: a simple-to-use, highly reliable means of interconnecting sub-systems and air studios.

While topologies such as fast Ethernet are familiar within our business operations — enabling a variety of printers to be shared by PCs littered around the station, for example — few of us have hands-on experience with transferring literally gigabytes of digitized data on demand.

Until we can rely on digital bits and bytes leaving one location and arriving safely at another with the peace-of-mind that we enjoy with analog systems, full-scale integration of digital components within a radio station must remain a dream of the future.

## Standouts

Sure, exceptions do exist. I know of several stations using Fiber Distributed Data Interface (FDDI) and copper wire-based CDDI networks to provide on-line access to large amounts of digitized music cues, IDs and promos stored on central hard-disk servers.

However, the majority of these systems are constructed from proprietary components. Often this means we cannot easily expand their operation without incurring a cost penalty.

In defense of the manufacturers, it often makes sense to design and offer what is effectively a closed system, utilizing hardware and interconnect schemes over which you have total control. Not every chief engineer is conversant with the operational parameters of high-capacity, on-demand communication protocols and their hardware constraints.

The time has come, I would hazard, for a more realistic approach.

Recently, I had reason to study the background of a new interconnect standard that holds great promise for this and

other applications: IEEE 1394 or "FireWire." This has been heralded as a major breakthrough for reliable, high-speed transfer of video, audio and graphics data because it enables what is referred to as "Isochronous Service."

In other words, FireWire guarantees transfer latency, or the length of time between an action being requested by the calling system and the resulting data transfer occurring.

This is an essential facility for on-demand audio playback.

**Up to 63 devices  
can be supported on  
a single FireWire bus,  
using a thin serial  
cable.**

We cannot wait while the system allocates sufficient bandwidth and channel capacity for the data to be delivered to an on-air studio so that the music cut, for example, can hit the D/A converter and the air chain. Once the transfer has been initiated from the remote location, we must ensure that sufficient carrying capacity is reserved until the file transfer is complete.

FireWire provides data transfer rates of 100, 200 or 400 Mbps, the equivalent of several hundred stereo 16-bit audio channels. Although FireWire is being touted primarily as a simple connection for consumer electronic systems including digital VCRs, cameras and audio components, it has potential application in broadcast and pro audio environments, as well as for computer peripherals such as hard drives.

Up to 63 devices can be supported on a single FireWire bus, using simple connectors and a thin serial cable. As a bonus, unlike SCSI-based interconnects, FireWire is hot-pluggable and will enable users to instantly add or remove up to a total of 1,394 devices! And this is with the bus active, without first turning off system components.

While SCSI devices are daisy-chained together in a serial fashion, with a non-conflicting addresses and termination of the final SCSI device, FireWire components can be connected in multiple configurations. These include star or tree patterns with individual, daisy-chained branches. Terminators are not required and addressing is performed dynamically.

A number of Japanese consumer electronics companies are planning to or have implemented FireWire interconnects, including Sony, Matsushita, Mitsubishi, FujiFilm Microdevices, Panasonic, Canon, Toshiba and Yamaha.

Yamaha is said to be developing a music local area network, referred to as "mLAN," that supports a 32-channel digital audio/MIDI interconnect scheme via FireWire. By providing an inexpensive, non-proprietary high-speed interconnect scheme for digital devices, IEEE 1394 may serve as a truly universal I/O for digital systems. With its scalable architecture and flexible peer-to-peer topology, IEEE 1394 is touted as an ideal topology for digital audio systems.

Being platform-independent, FireWire is described as representing an evolutionary improvement over current I/O interfaces and providing connectivity solutions for many ancillary market sectors. For example, I/O bridges can be used to hook up serial and parallel interfaces, while SCSI-3 is said to provide a migration path for parallel SCSI to IEEE 1394. Devices with differing transport rates can also be connected, allowing backward compatibility with slower systems.

There is no denying that for linking servers and digital components such as consoles and processing engines, ANSI Standard P1394 (the formalized document of IEEE 1394, approved in January of last year) holds great promise for our industry.

In an upcoming column, I'll take a close look at SONET (Synchronous Optical Network), a fiber-optic topology used last year to provide high-speed data-transfer of audio and video material among sports sites during the Summer Olympics in Atlanta.



537 A.D.  
King Arthur and Lancelot  
fight over date,  
and it's not the Queen



1000 A.D.  
Chinese invent gunpowder  
while formulating recipe  
for date nut bread



1492 A.D.  
Columbus leaves known world  
looking for a date



1815 A.D.  
Beethoven eats tangy date  
inspiring 5th Symphony



54 A.D.  
Claudius eats poison date,  
Nero gets Rome

## GREAT DATES IN HISTORY



1955 A.D.  
"Chubby Checkers"  
slips on date  
and invents the "Twist"

1997

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TELEPHONE DIGITAL HYBRIDS  
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4000 B.C.  
Adam and Eve  
leave fertile date orchard  
for cold and cruel world



1960 A.D.  
English rock group  
chooses name "Beatles"  
over "Wrinkled Dates"



300 million B.C.  
first date ripens on earth

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1980 A.D.  
Princess Di misunderstands  
when Charles asks for a date

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# How to Hand-Handle Radio Directing

*Editor's note: Modern live radio shows and radio drama production depend heavily on clear communication between talent and technical staff. Being able to understand certain hand cues is important, just as it was 65 years ago.*

*This piece originally ran in Radio World way back on April 23, 1932. As you know, that RW was printed during the 1920s and 1930s and is unrelated to the publication you hold now, except in name. See how many of these old-time signals you know, remember or can figure out.*

Sign language is as old as the human race and new as radio. No studio program could function without the aid of this primitive means of communication. To the uninitiated attending a broadcast, the gesticulations of announcers are bewildering.

Studio directors resort to setting-up exercises combined with sign language to convey the messages. "Tone down the bass drum," "Move the flute player up a bit," "Make that crooner turn her face towards the mic" and "Speed up the show."

Under long-established practice in the National Broadcasting Company studios, a

finger planted firmly against the side of the nose signifies the program is running according to schedule. A hand extended with thumb and first finger at right angles is the signal for a local station announcement.

Synchronization of networks is indicated by crossing fingers of one hand against those of another.

### Curious gestures

Two fingers worked in a shearing motion call for a cut in the program which is running overtime. When the outspread fingers of an upheld hand are drawn inward, the orchestra musicians know they should move closer to the microphone.

A half-closed hand calls for a fadeout. An arm extended straight out following this signal is an order to cut the program dead.

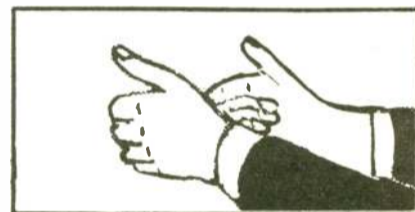
Hands drawn slowly together with fingers turned in and thumbs pointed up means for the speaker or singer to move closer to the microphone. The signal reversed, of course, is interpreted as an order to move away.

If the orchestra director sees the production man waving his hands in circles, he knows the program is lagging and must be speeded up. Hands lowered with the palms down means play more softly. Hands raised repeatedly means play louder.

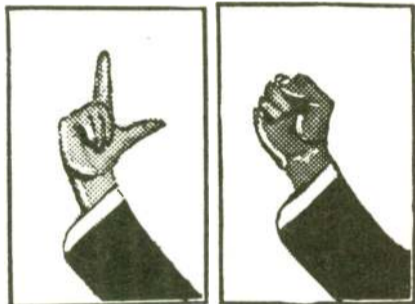
The control room, which might be called the "listening" room, adjoins the studio and is separated from it by a soundproof glass partition. In this small compartment sits the engineer before the control dials and beside a loudspeaker over which is heard the program originating in the studio.

Next to him is the production man, who directs the program through the glass by signals. However, it is not unusual to see him suddenly dash into the studio and push a soprano closer to the microphone, whisper to the director or wave his hands this way and that to convey messages.

Mechanical intercommunicating devices such as silent telautographs have been installed in studios, but have failed to supplant the primitive sign language. They serve their purpose to some extent but have not the flexibility or facility of the human sign language.

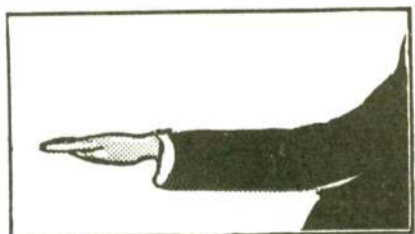


Move Closer to Microphone

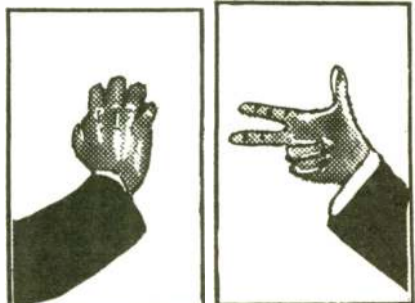


Local Announcement

To Musicians—Close Off



Cut Program After Fadeout



Fadeout

Cut Program

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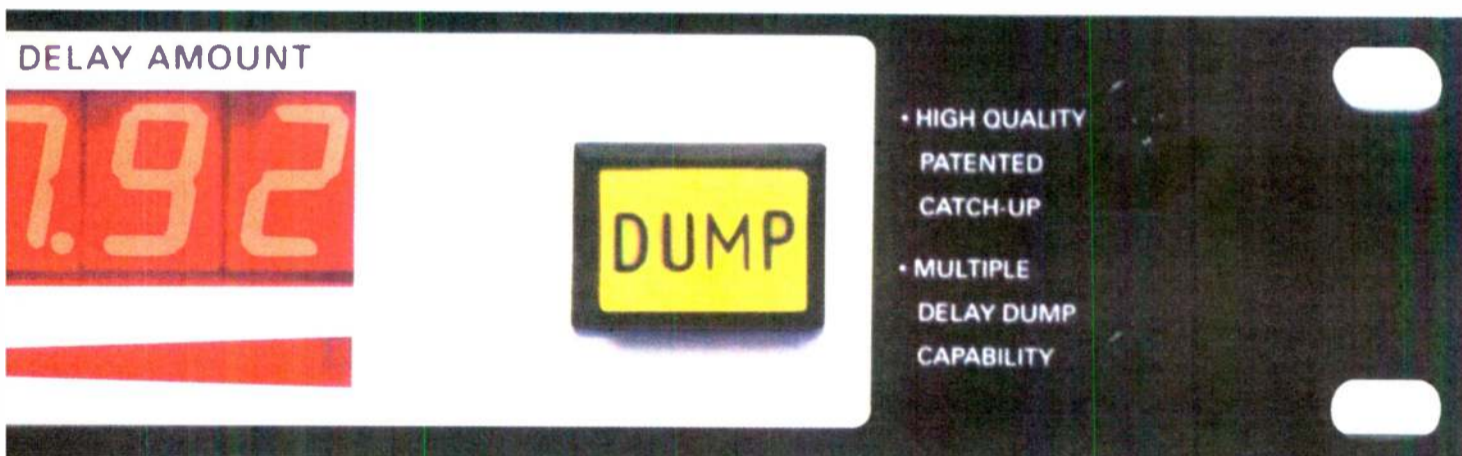


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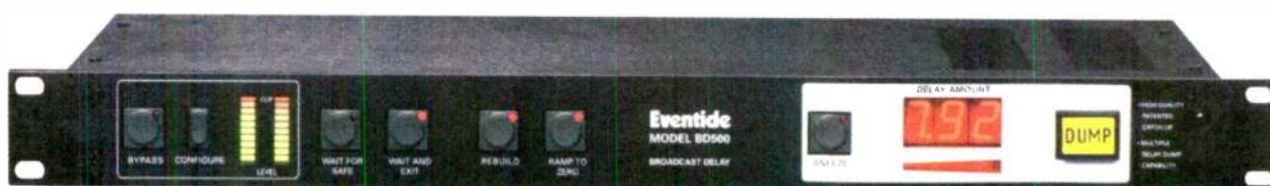
You also get the cleanest, quickest delay catch-up you can buy. Because there's only one way to maximize audio quality and still catch-up rapidly after a delay dump... and Eventide owns the patent. Over the years, several other brands of delay have come and gone. But the simple fact is that the catch-up methods others use must be painfully S-L-O-W to avoid serious audio problems.



And, because you may not be using that analog console forever, the BD500 is also the only broadcast delay that's digital-

ready with optional AES/EBU digital audio inputs and outputs. It's stereo, of course. A convenient new "sneeze" button allows the talent to sneeze, cough, etc. without being heard on air, and without dead air. All front panel switches (except configure) and all status indicators can be remoted (both RS-232 and dry contacts are provided.) Plus, only the BD500 gives talent both a digital readout of delay time and a "quick read" LED bar graph that shows "you're safe" at a glance.

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## Can a digital console be too quiet?

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0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0



While others are making noise about how great their digital consoles will be, PR&E has been quietly working on a great digital console. Integrity. All the features and reliability you expect from PR&E. See it at NAB booth N-2618.



PACIFIC RESEARCH & ENGINEERING

Circle (46) On Reader Service Card

World Radio History

# Mouse Roars, Swallows Giant

C. 'Rich' Rarey

The mighty have been met, and assimilated. This column is pleased to be the first to break the news of a business arrangement that will shake the foundations of both public and commercial broadcasting.

On April Fool's Day, National Public Radio is expected to announce that it has acquired — through a brilliantly executed leveraged move — the ownership of Time Warner Inc., arguably the largest media organization in the world.

This acquisition is expected to provide a reliable funding for public radio stations for the next 75 years, while improving the quality of all Time Warner's provided content.

## Terms of the deal

According to the still-secret terms of the acquisition — to have been consummated on April 1 — the following steps will be taken immediately by NPR and its member stations:

1. NPR will hold 58 percent of Time Warner's preferred and common stock in a living trust.

2. Every NPR member station will have an elected member on the Time Warner board of directors.

3. There will be no further public radio pledge drives and programming will never again be interrupted by pitching or funding credits.

4. NPR will influence content and oversee all editorial decisions of Time Warner's media operations.

5. Money from listeners and government grants (including the trickle from the federal government) received after Jan. 1, 1997 will be returned with 6.25 percent interest, and

6. Mugs, T-shirts, and CDs of "Car Talk" and "Performance Today" will be available, free of charge, to any listener that requests one. Prices on "Prairie Home Companion" products will be reduced to wholesale.

Time Warner, in turn, will do the following:

1. Fund NPR at 250 percent of its current annual budget.

2. Completely fund each of the 550 NPR member stations at 400 percent of that station's current budget.

3. Provide NPR and the public radio stations with 12.89 percent increases each year for the next 10 years.

4. Provide extensive "good will" publicity through advertisements designed to acquaint the American public with public radio, and also with what the "real Garrison" is like, and

5. Establish a "CNPR" cable channel, required carriage by all U.S. cable operators, that broadcasts a continuous video stream from selected public radio stations.

## The new empire

Time Warner Inc. owns various print publications, such as Time magazine and Sports Illustrated, as well as influential media outlets including CNN, Warner Bros. Movies, Television and Music, HBO, Cinemax, Turner Classic Movies, TNT, the Cartoon Network, Castle Rock Entertainment and New Line Cinema, among others. The company also owns the Atlanta Braves, the Atlanta Hawks and World Championship Wrestling.



Some market analysts worried that Time Warner's posted (1994) earnings of more than \$2.96 billion (before interest, taxes, depreciation and amortization) would never again be possible under

**Prices on 'Prairie Home Companion' products will be reduced to wholesale.**

NPR ownership, but others industry analysts told *Public Domain* that the comparatively small money redirected to support public radio would not affect the company's strong profits for 1997.

"When this deal happens, expect the market to embrace Time Warner stock, whatever's left of it," said inside analyst C. "Charles" Mayer.

"The word on the street is this naked power grab will inspire other non-profits to reach for the nearest multi-national corporation and acquire it. At this rate, the country will be soon filled with dogooder organizations that wield billions of dollars and frankly, that's a startling thought."

*Public Domain* has been making quiet inquiries regarding the acquisition, and by most accounts, the opinion is positive. Congressional leaders are expected to endorse the move, citing that the acquisition is consistent with their "Contract Out On America" clause to eliminate government funding of public broadcasting.

## Congress speaks

"Wow, it's neat!" exclaimed one House member. "We've been lying — or is it laying? — in wait to kill off financing to the public broadcasting beast, and now we can!" Reports from other congressional offices indicate that a small but growing list of representatives are calling the NPR headquarters, asking for some "quality time" and "some really good coffee in the 7th floor cafeteria" with NPR President C. "Del" Lewis. Unconfirmed reports say that one senior White House official has offered \$50,000 just for a cup of the cafeteria's French Roast.

Spokespersons from both companies spoke with passion about the "synergy" that would create a range of new programming ideas (or "unprovided content," as programming ideas will be known in the future).

"One such idea," offered C. "Sandy" Rattley-Lewis of NPR Program Strategies Board, "is for a CNPR program that uses Time Warner's exciting

interactive technology. We plan to provide live video from the sweater closet of America's Newscaster, Carl Kasell, and viewers and listeners can urge Carl to wear a pale off-shade of green, or a pale off-shade of blue."

At present, Kasell's sweaters are underwritten by the Asia-Pacific Angora Foundation.

Further comments have filtered in from the Corporation for Public Broadcasting and from PBS. "We're really, really interested in remaining friends" with NPR and Time Warner, said CPB executive C. "Rick" Madden. "Since public radio won't be taking funding from us, we are hoping that we can take all that saved money and produce one, maybe two, fine television documentaries. After that, we're hoping to become a non-profit division of Time Warner ... only with NPR's blessing, of course."

Not all participants are thrilled with the news. One former NPR board member has told *Public Domain* that he disagrees completely with the pending deal.

"It's outrageous!" said C. "Hill" Oats, manager of a public station in the Midwest.

"Without some restraints, public radio will just spin out of control, being flush with cash and all. We'll probably have to

start paying for employee health care! Also, how come all stations just get one vote on the Time Warner board?"

NPR's president, C. "Del" Lewis, has privately told *Public Domain* that only a fraction of the gross profits from Time Warner operations will have to go to fund the network and its member stations. "After all," he said off-the-record, "the salary of only one Time Warner board member will go to fund 25 percent of NPR's yearly operation, while the remainder of the NPR annual budget will be made by redirecting 1 percent of the profit made by CNN."

"The public radio stations funding will come from a combination of sources, and since we'll have to pay fewer stock holders, the Time Warner employees — those that actually produce a product, not the upper management — will receive a pay increase as well."

## Happy ending

So, America, please take note: As you watch your favorite cable TV programs, listen to CDs or just read popular magazines, you are helping to maintain a healthy, vibrant, public radio system for decades to come.

Until next month, I remain,  
Your obd'n't eng'r.



*Rich Rarey, formerly technical director of NPR's "Talk of the Nation," is now looking forward to becoming a senior VP of Time Warner Inc. You can still reach him at rrarey@npr.org and he wishes everybody at NPR and Time Warner a happy April Fool's Day.*

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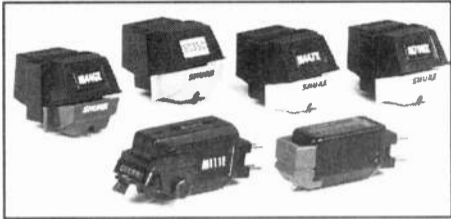
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# PRODUCT GUIDE

Companies with new product announcements for Studio Sessions Product Guide should send them to:  
Radio World, c/o Studio Sessions Editor, P.O. Box 1214, Falls Church, VA. 22041

## Shure Cartridges

Shure Brothers Inc. has unveiled a new line of phono cartridges in response to the resurgent interest in vinyl discs for recorded music.



The product line starts with the top-of-the-line M111E cartridge, equipped with the Shure Dynamic Stabilizer shock absorber. The SC35C is built for tonearms with a 4-5 gram tracking force. The M44GX and M44X models are for value-oriented performance. The M92E features a biradial diamond tip and low tracking force. Prices range from \$24.95 to \$99.95.

For information, contact Shure Brothers at (708) 866-2200 or circle Reader Service 70.

## Gepco Shielded Cable

Gepco International has a new outer jacket compound for its series 4200 and 720 audio cable.

GEP-FLEX provides an increased temperature range to minus 60 degrees C,

making it suitable for indoor and remote use. Because of the cable's CM rating, it can be used both in temporary and permanent installations. GEP-FLEX cable is available in single or multi-pair configurations and can be cut to customer length specifications.

For information, contact Gepco International at (312) 733-9555 or circle Reader Service 71.

## PG Music Software

Band-In-A-Box (BIAB) from PG Music is out in version 7.0 for Windows. This is a software program for PC and Mac that automatically arranges music and plays it back via MIDI. Pick a musical style and BIAB creates a virtual five-piece band. It is a useful computer/MIDI tool for production directors, in creating specialized commercial or promo music quickly, and in creating song parodies for radio morning shows.

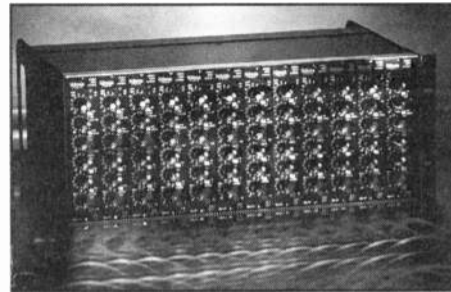
Version 7 contains 60 new features and a number of new musical styles, including several that emulate Manilow arrangements, "Achy Breaky" line dances and the Beach Boys.

For information, contact PG Music at (250) 475-2874 or circle Reader Service 73.

## Millennia Media Mixer

The Mixing Suite professional mixing

system is available from Millennia Media. The rack-mountable line-level mixer is almost entirely DC-coupled, without the addition of servo amplifiers. It features high-speed, high-headroom signal path design. The Mixing Suite is modular and can be configured as small as 3x2 or as large as 80x4x4. Frequency



response is 2 Hz-300 kHz with typical THD+N of 9 ppm. The Mixing Suite is hand-made in the United States and has a one-year limited warranty.

For information, contact Millennia Media at (916) 647-0750 or circle Reader Service 72.

## Zoom 1204 Processor

The new Zoom Studio 1204 rack processor features vocoder effects, vocal distortion programs and an effective rotary speaker ("Leslie") simulator.

These effects are in addition to the onboard 18-bit, 44.1 kHz digital reverbs.

flangers and delays found in the 1204. Real-time control over effects is possible via MIDI. Two "easy-edit," front-panel controls offer quick modification of programs. A front-panel input jack allows mics to control the vocoder circuit directly.

Suggested price of the Zoom Studio 1204 is \$249.

For information, contact Samson Technologies at (516) 364-2244 or circle Reader Service 74.

## Denon CD-ROM Jukebox

Radio folks should take note of a new CD-ROM device from Denon Electronics. The company has premiered the DRD-1408 CD-ROM jukebox, with 200-disc capacity. Although designed for data retrieval, the unit has stereo sound output capability that makes it suitable for storage of production libraries and effects archives.

The unit stores CDs in two trays of 100 each and features a dual-transport design. Playback of CD-ROMs is at 8x speed. Up to 16 DRD units can be chained, allowing immediate access to 3,200 CD-ROMs. Control is from a Windows NT-driven PC. The drives can be operated independently, allowing the user to simultaneously tap into two discs.

For information, contact Denon Electronics at (201) 575-7810 or circle Reader Service 75.

## How to tame transmitter power problems.

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For example, a 15% undervoltage can decrease power tube life because cold operation promotes contaminant buildup in the tube. Conversely, a 10% overvoltage decreases life because increased temperature accelerates the decarburizing process.

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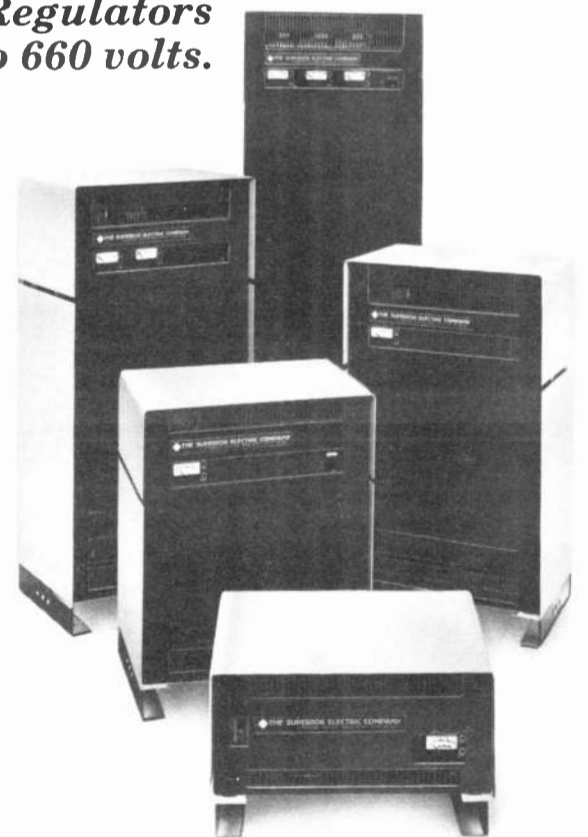
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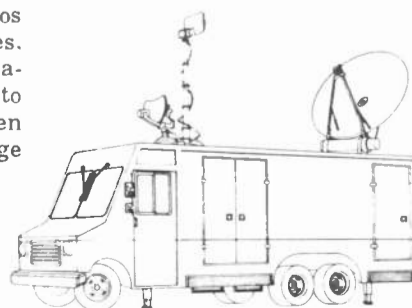
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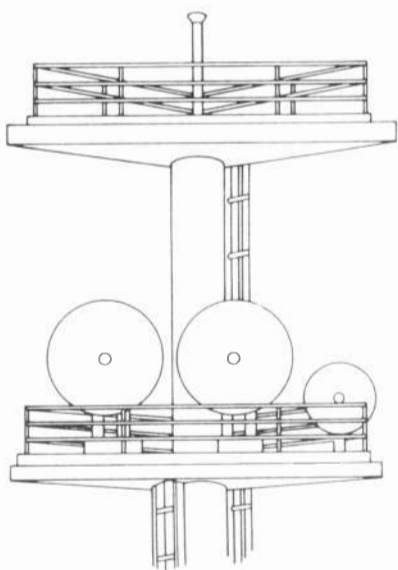
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# Running Radio



Promote Yourself With Famous Faces Page 64

Radio World

Resource for Business, Programming & Sales

April 2, 1997

## Hispanic Radio: Stories to Tell

John Montone

Operators of Hispanic radio stations are quick to make two points: Major advertisers are starting to come their way, and Hispanic targeted stations are not monolithic.

Gordon Mason, the president of the Southern California Broadcasters Association, points to KLVE(FM) Los Angeles with its 6.9 fall '96 cume.

"They're billing 25 to 30 million dollars," he said.

Among the station's major advertisers are Budweiser, Bank of America and the California Lottery.

While they are starting to make more money, Hispanic-targeted stations are also undergoing a diversification much like the rest of the market. Formats include Balladas, Bandera, Rachero and Salsa music. There are News/Talk Spanish stations as well.

### More Hispanic radio

Mason predicts that more English stations will switch to Hispanic formats in the future. "It's a good thing for the industry," he said, "it stays with the population growth. You have a diverse world with diverse radio stations, and radio listening is up."

The operators of some of the nation's largest Hispanic broadcast companies are

in agreement.

Carey Davis is general manager of WSKQ-FM, WPAE-FM and WXLN(AM) in the New York metropolitan area. The stations are owned and operated by The Hispanic Broadcasting Company, formed by Raul Alarcon, who grew up in Corona, Queens. Davis described it as "a real rag-to-riches story."

Like Mason, Davis predicts the trend toward Hispanic programming will continue. "Latinos will make up one-third of the population in New York by the year



2000. They are an emerging middle class." In Los Angeles, the Hispanic population, mostly from Mexico, makes up about 40 percent of the population base.

Where there are people, advertising dollars start to flow, Davis said. "We just got our first Macy's order ever, and a big order from A&P. The potential is unlimited and it's starting to happen. Every week a general advertiser is coming to us. And it's because we have the cars."

Liberman Broadcasting in southern

California was founded by Hispanic broadcasting pioneer Jose Liberman. Company Vice President Andy Mars has already seen a surge in general advertising revenue. Liberman owns FM stations KKHJ in Los Angeles, KBUE in Long Beach, and KBUA in San Fernando, as well as KWIZ-AM-FM in Orange County. The company counts Budweiser, AT&T and MCI as major advertising accounts.

"Our national advertising has been solid for three or four years," he said, "and the investment is getting greater as they recognize audience growth." Mars said the Liberman stations also benefit from the absence of print alternatives. "There's only one Spanish daily for 4 to 6 million people," he said. "I compete more with TV."

A dissenting note comes from Richard Heftel, the president and general manager of Heftel Broadcasting Corp., which owns three Hispanic targeted stations in the Los Angeles market: KTNQ(AM), KSCA(FM) and KLVE. "We still don't get our fair share," he said.

"We have 9 percent of the listening audience, but we don't get 9 percent of the ad dollars," Heftel blamed "advertising prejudice" and a "lack of education" at certain agencies.

"Some agencies don't want to clue their clients into Spanish, and there are some prejudices by the clients," he said. But he sees improvement: "Every day it gets better. We get all the fast foods, the

See SPANISH, page 67



Richard Heftel

### RADIO REVENUE : JANUARY

Local	8%
National	7%
Overall	8%

0 5 10 15%

### 'A Great Start' For '97 Sales

"Last year will be a tough act to follow, but by all indications, 1997 has the potential to surpass it," said Gary Fries, president of the Radio Advertising Bureau.

The cause for his optimism: radio revenue figures for the first month of this year, showing combined local and national spot advertising up 8 percent over the same period a year earlier. It was the 53rd consecutive month of gains in the RAB monthly report, which is based on its index of more than 100 markets.

## Get Your FM Signal From Here to There

Ed Montgomery

This is the seventh installment in a multipart series intended "to make the new generation of FM broadcast station managers aware of the equipment for which they are responsible and to help them periodically review how the equipment is operating." The previous part appeared March 5.

In this age when a chief engineer is not always present at every radio station, it is important for management, and anyone in charge of operating the station to know what is going on and how to convey important information to an engineer at some distant location.

The distance between the studio and transmitter can be a matter of feet or miles. If the transmitter is at a remote location, all key employees should know where it is and how to get to it. Many times a problem can be solved just by resetting a circuit breaker. However, if the person at the station has no clue where the switch might be, the station may remain off the air for an unreasonable amount of time.

Transmitter sites can be located atop buildings, on mountains or at tall towers where terrain is relatively flat. Keys and information for accessing the building must be made available at all times for employees responsible for the station's operation to access the site. Information about entering an office building after-hours or codes to operate an elevator to the location of the transmitter should be clearly identified and always on hand.

It is important, at locations where several broadcasters share a tower site, to clearly identify your transmitter and the electrical circuits that feed it. Switching unknown breakers on and off could put another broadcaster off-air.

If the transmitter site receives studio audio from telephone lines, it is important to know what the circuit numbers are for these lines. They

See FM, page 62



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# FM Fundamentals

► FM, continued from page 61

should be written on the line terminal equipment mounted on the wall where telephone lines come into the station.

Audio lines need to be tagged and identified at both the studio and transmitter site. Telephone lines are still necessary where a line-of-site signal via STL cannot be established between the two locations. It is also important to have the telephone company repair service number at these locations.

Telephone lines are still quite reliable but service can occasionally be degraded or disrupted for a number of reasons. The telephone company may have done some construction or renovation at their central office and reconfigured your transmission lines without notifying you. They may have inadvertently crossed your audio line with other audio or data lines. This can be corrected quickly if the operator at the station has the proper telephone numbers at his or her disposal.

### The mod monitor

A broadcast modulation monitor can reveal a lot of information about the quality of the on-air broadcast. It should be considered an essential part of the broadcast studio, even though it is not required in all instances.

For example, if the telephone company reverses the wires on one of the telephone lines during a time of maintenance or renovation, the modulation monitor will quickly display this with a very high level of signal in the L-R or difference channel. Improper phasing can be confirmed quickly by listening to the air monitor in a monophonic position.

The modulation monitor will indicate L and R channel imbalances and whether the station is over-modulating. Most importantly, it can alert the individual responsible for station operation whether or not the transmitter is actually on the air. The modulation monitor, along with the SCA monitor, can also confirm that the SCA service is being broadcast in compliance with contracts that have been agreed to.

### From here to there

The preferred way of conveying the studio signal to the transmitter is with a studio-transmitter-link (STL).

Broadcast STLs use the 950 MHz portion of the UHF band and employ low-power transmitters — typically 5 to 15 W — to direct a signal from the studio to the transmitter. It can be analog or digital. The sum and difference channels, along with any subcarriers, can be combined at the studio and sent to the transmitter site where they are decoded and placed directly into the exciter. This is known as composite stereo.

Separate right and left STL transmitters can send each channel individually to the transmitter site where they are decoded by a right and left receiver.

This is known as discrete channel transmission. It is important to know what kind of system is being used to understand what might happen if the system

fails. If one transmitter or receiver of a discrete channel system fails, the other channel can be used and the station can operate monophonically until repairs can be made.

Studio transmitter links operate with low power and have excellent life expectancies. Component failures can occur because of power surges or lightning strikes, but they usually can run for years without problems. Since it is radio energy being sent, it is important that the transmitter and receiver antennas are attached firmly to their support masts. High winds should not cause any antenna movement.

### No interruptions

Radio signals in the 950 MHz region require line-of-site transmission. The transmitter antenna must be able to see the receiving antenna to insure an uninterrupted signal path. If that path is blocked and an interference-free signal cannot be achieved, a repeater might be considered to insure consistent signal.

In situations where the STL path is short — within about five miles — a blocked path can sometimes still be used if it is evaluated by pre-testing.

**The engineer responsible for station operation should attach the normal operating readings to the front of the STL.**

The transmitter and receiver of the STL come equipped with meters that display several functions. The transmitter meter can display forward and reverse signal readings indicating just how much power is being radiated. This can

indicate a transmission line or antenna problem developing if observed on a weekly basis.

### Make it clear

The engineer or consultant responsible for station operation should attach the normal operating readings to the front of the STL so that station personnel can compare them. If they start to wander, call the engineer, do not try to adjust the STL.

The receiver at the transmitter site will have a signal strength meter. The strength of the receiver signal should have been recorded and posted when the system was installed. Signal strength may vary slightly with the change of season, but if it significantly drops and never returns, it may indicate a problem with the receiver or signal path.

Over the years, trees grow and foliage may block the path, or possibly a large building has been constructed in the STL signal path.

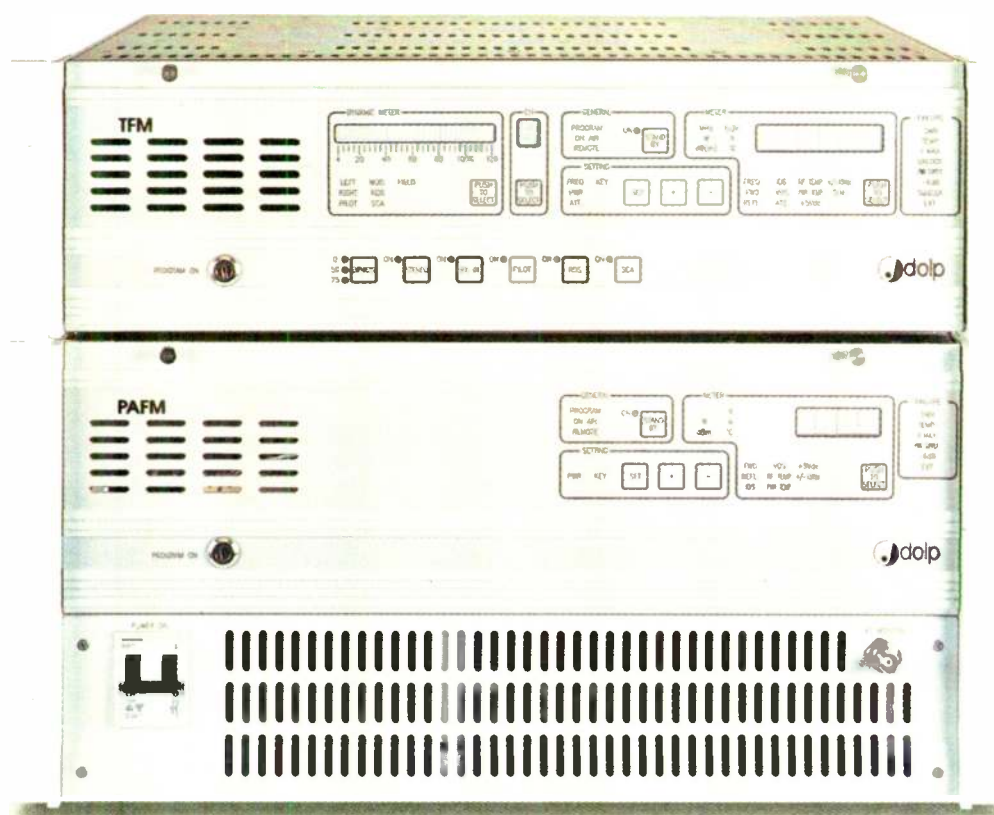
The broadcaster needs to be aware of this and take steps to restore proper signal levels. Plotting a map illustrating the path of the signal can assist one in determining where the signal loss might be taking place.

■■■

*Ed Montgomery is lab director at Thomas Jefferson High School for Science and Technology in Alexandria, Va., and a part-time radio engineer. He also taught college-level broadcast engineering technology and has written educational columns for RW. Contact him via e-mail at [emontgom@lan.tjhsst.edu](mailto:emontgom@lan.tjhsst.edu)*

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Itelco group web site <http://www.itelco-usa.com>.

## STATION SNAPSHOT

# Q102 Pumps Powerful Promos

Alan Haber

When Rod Stewart took to the stage at the Aladdin Hotel in Las Vegas during an internationally-televised Billboard Music Awards to sing "If We Fall in Love Tonight," no one in the live audience — or in Cincinnati — had the faintest idea about what Stewart would slip in as the last notes of the song trickled away.

Stewart had visited Brian Douglas and JohnJay Van Es during their morning show on WKRP(FM) Cincinnati the day before. He called the team just moments before leaving his hotel to fly to Las Vegas. "I'm addicted to you guys," Stewart said.

"Hey, Rod," asked JohnJay, "Tonight, when you're up there, can you wink or kind of point for us and say something? Do something special for us, Rod."

"I'll take me trousers off for ya," replied Stewart.

Stewart didn't, but he did change the lyrics of a line of "If We Fall In Love Tonight" before he left the stage, singing "Listen to JohnJay and Brian, all the time" and sending fans of the Top 40 morning team into a titanic tizzy.

Annie Challis, Stewart's manager, called Brian and JohnJay the morning after the awards show to ask the duo if they had heard Stewart's reference. They had and were thrilled. A listener, excited by Stewart's musical nod, called to ask

the duo jokingly if they had bribed or stalked Stewart to make him do what he did.

The station was ready to take advantage of this unexpected largesse. It sent a promotional package to local and national media the morning after the show, featuring an audio cassette with the singer's phone call, a clip of Stewart singing

**The station was ready to take advantage of this unexpected largesse.**

about them, and the caller's reaction. The package also contained a press release and video cassette documenting the healthy dose of Stewart-mania that swept through Cincinnati.

The package was typical of the promotion-minded machine at Q102.

#### Another day, another promo

Q102 knows how to get the most out of popular culture. Last fall, actor Barry Williams (Greg "Brady Bunch" Brady) hosted Q102's "One Earth" party, attended by 30,000 listeners and featuring 1970s groups KC and the Sunshine Band

and the Village People.

Another station event was a "three-hour tour" on the Ohio River in 1994, hosted by Bob Denver, Dawn Wells and Russell Johnson, otherwise known as Gilligan, Mary Ann and the Professor from television's "Gilligan's Island."

Q102 targets its predominantly 25-34 female audience with fun promotions to keep station loyalty high.

"All people are trying to do is have a good time," said Von Freeman, the station's marketing and promotions director. "Radio is simply there as a good friend in the car to make you smile. If we don't do that, if we get too serious ... then we're not doing our listeners any service."

"When you bring in Les Nessman, or you bring in Davy Jones, you put a smile on people's faces just by association. It doesn't matter how long ago the show (was) on. What you're doing is tapping in to their good times. That's what we're all about."

#### Les is more

Les Nessman, the all-star newsman of "WKRP in Cincinnati," the "winner" of the coveted Silver Sow Award and Copper Cob Trophy, and five-time recipient of the Buckeye Newshawk Award, was on the air with Q102's morning team the day before Thanksgiving.

Actor Richard Sanders wore his

See Q102, page 65 ▶



Former Brady Barry Williams ...



Hillbilly Donna Douglas ...



Rocker Rod Stewart ...

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► Q102, continued from page 65

standard-issue Les Nessman bow tie and glasses as he climbed aboard a lift and helped Brian and JohnJay distribute 102 turkeys to the excited crowd of station listeners gathered about 60 feet below in Cincinnati's Fountain Square.

Brian was covered in a tantalizing turkey outfit: JohnJay was dressed as a pilgrim. (For proof, see page 66.)

The event was a recreation of the famous "WGRP" episode in which the station dropped live turkeys to the ground as a promotional stunt. The trick back-fired. Turkeys, of course, cannot fly.

Using the nearby Rock Bottom Brewery as a base, Brian and JohnJay reminisced about WGRP on the air with Sanders, who stayed in character for the entire broadcast, except when disclosing the whereabouts of the TV cast.

Listeners who came to watch were fed a turkey-themed breakfast, won fabulous



... and Monkee Davy Jones visit Q102.

prizes, and followed the morning team outside in the brisk Cincinnati air to take their chances at winning one of 102 turkeys from advertiser Shady Brook Farms.

Completely in character, Sanders remarked that the original WGRP turkey drop "was a bomb. It was at the Pinedale Shopping Mall, as you all recall. Mr. Carlson insisted that turkeys can fly." The "poor birds," he remembered, "crashed down like sacks of wet cement and splattered through people's windshields. It was a horrible mess ... I'm sure it'll go much better today."

It did. Around 8:30 a.m., Sanders kicked in with play-by-play. The first turkey went flying, he told listeners, "falling to the earth from hundreds of feet into the air! Beautiful bird. Here comes another bird, and another! Another bird is leaping to its future as a turkey dinner, and here comes a whole flock of those little baby birds. Oh, this is beautiful! This is beautiful."

Fortunately, the turkeys were origami — folded paper.

Sanders continued, to the delight of the crowd: "Here comes a pigeon," he exclaimed. "No, don't grab the pigeon! Grab one of these beautiful turkey birds." Sanders urged the crowd to be kind to one another. "If you catch more than one bird," he suggested, "please share it with your neighbor who isn't as fortunate."

**A feather in Q102's turkey cap**

Paper turkeys or not, this real station promotion required planning. "Gobblefest '96," as Freeman called it, went well. According to Janet Hill-Smith, event producer for Downtown Cincinnati, city officials were initially concerned that dropping the turkeys would cause people to scramble, but were told that Q102 would make sure that wouldn't happen.

The city officials "wanted to make sure that we stayed (in the town square) and that none of the turkeys would flutter into the streets."

Hill-Smith helped make the turkey drop a success by initiating all contacts with the city. "I thought that they had a great idea," she said. "We were able to execute it easily."

Freeman booked Sanders six months in advance. Planners chose to drop paper turkeys, rather than anything more substantial, for safety reasons. In addition to the frozen turkeys given away at the event, 25 were donated by the station to the Salvation Army.

For Q102, the ultimate benefit was to boost awareness of its morning show. Brian, the station's award-winning former afternoon personality, and JohnJay, who came from KIFM(FM) San Diego,

had only been working mornings together for six weeks.

"The whole idea is to create talk every

**I never view a promotion as something free or value-added. It's always got a price tag on it.**

— Von Freeman

morning?" And we accomplished that. In fact, we may have started an annual event."

"What we do at our radio station is ... sell promotions," said Freeman. "I never view a promotion as something free or value-added. It's always got a price tag on it. If it is airtime, it is a sold product, and I think a lot of radio stations forget that fact."

Freeman said he sees his job as enhancing "our product for our customer, which is our advertiser."

To Freeman, the turkey drop was "the perfect promotion."

For the station that brought in Meat Loaf to skate with listeners, hired Les Nessman to help drop turkeys, and was serenaded by Rod Stewart on television, every day is just another successful promotional day.

day, so every time (Brian and JohnJay) go on the air, somebody's standing around the water cooler (saying) 'Did you hear what Brian and JohnJay did this

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# The Actor Fathered the Newsman

Alan Haber

Although he's done quite a bit of acting since portraying lovable newsman Les Nessman from 1978 to 1982 on the original run of television's "WKRP in Cincinnati," actor Richard Sanders is perhaps best known as the Queen City's most famous news source.

Nessman's spectacular career, documented throughout the run of the show by creator Hugh Wilson and a group of talented writers, is legendary in radio circles. Most legendary is the turkey episode in which the station dropped live turkeys from a helicopter. Turkeys, as they quickly discovered, don't fly.

Sanders has "recreated" the famous WKRP turkey drop many times at a variety of radio stations, including WYSP(FM) in Philadelphia and KBEQ-FM in Kansas City. "It always makes people smile," said Sanders, "no matter where we do it."

"WKRP" continues to be a favorite TV show inside the radio business. "I've had innumerable people in radio tell me that that's why they went into radio — because they used to watch WKRP and thought it looked like kind of an interesting job," said Sanders.

Sanders holds affection for Nessman. "The thing about Les," he said, "(is) I think he took himself awfully seriously. He was the broadcast journalism professional. He was the professional there, and

the DJs were there just to get in his way."

He laughed. "He was always trying to be exceedingly good at his job, and he was exceedingly bad at it."

Nessman tried to do a great job with the news. "I always said he was sort of stuck back in the Eisenhower era — in the '50s or so, like his glasses. He was tied to trying to do things the way they should be done, and had no flexibility really. Therefore, it was really funny to see him in relation to "Johnny Fever" and Venus Flytrap, WKRP DJs.

### A TV radio classic

Sanders helped to develop his character by visiting all-news station KFWB(AM) in Los Angeles. He was also influenced by his experiences at the college radio station at the Carnegie Technical Schools in Pittsburgh, now Carnegie Mellon University.

"We had a little station," said Sanders. "You could just kind of volunteer to go in and run the board there. We had to be very careful not to step in the pool of water underneath the board," he said, laughing again, "so we didn't electrocute ourselves."

Although the actor never actually pursued a career in radio, he has visited quite a few radio stations for appearances, fill-in DJ work, and turkey drops. Radio, he said, was always "something that interested me, so I was happy to at least do it vicariously."

News people might not always appreci-

ate his legacy, though. "The DJ always says, 'Well, our newsman here is just like Les Nessman — I mean, we call him Les, you know. We put tape down around his door.'"

He was also happy to wear a bandage on each show, always on a different part of his body. The genesis of this running gag was a pre-taping accident on the day he shot the pilot for "WKRP." Being treated at the hospital for a head injury, he was told he would have to have stitches. No stitches, he said; he had a show to do. He figured the damage could be covered up by make-up.

It could not, because of the risk of infection. So he put on a bandage, and a line was inserted into the pilot script to explain it away. By the time the show got picked up by CBS, Sanders remembers thinking he "had figured out that Les would probably have a bandage" and a running gag was born.

Another running gag involved invisible walls around the newsman's desk. In conjunction with the first episode that Sanders wrote for "WKRP," in which Nessman won the Silver Sow Award, producer Wilson decided that it was necessary to have a bullpen area where the cast could congregate. Wilson, said Sanders, "suggested that probably Les would have some sort of separation there, and he suggested that we put the tape on



Richard Sanders



Sanders/Nessman With Brian Douglas and John Jay Van Es

the floor." In subsequent episodes certain characters "could come right in, certain people had to knock a lot," said Sanders. "We'd take it to extremes, you know. Sometimes he'd lock his office." After awhile, he said, "people kind of went along. Okay, it has to be shut and locked, you know, in the station, as if that was normal behavior."

Sanders said it's still fun to be Les Nessman. With all of his radio news "experience," he thinks that he "should probably look for a job as a news director at a radio station." Or at least as an anchor.

"Now that David Brinkley has retired," said Sanders, "maybe Les has a shot there."



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KTAR-AM

# Now on the Internet: RealVideo

*Radio Managers With Audio on the 'Net Must Ponder a New Factor: RealVideo Streaming*

**Frank Beacham**

Progressive Networks, the Seattle company that dominates the Internet audio market with its RealAudio streaming technology, earlier this year unveiled RealVideo, a cross-platform client-server system for delivering video programming on computer networks.

Seeking to maintain its market dominance in real-time Internet media, the company offered more than 10 million current RealAudio users immediate, free upgrades to RealPlayer, its new all-in-one multimedia playback software for Windows, Macintosh, UNIX, WebTV and other Web-enabled platforms.

Progressive also announced that more than 60 broadcast, entertainment and technology companies have committed to integrate or support RealVideo on their Internet Web sites. Several announced immediate plans to begin RealVideo telecasting.

"Progressive Networks is 100 percent focused on turning the Web into a true mass medium," said Rob Glaser, Progressive's chairman and CEO.

**Streaming**

RealVideo is the first Internet video standard built on Real Time Streaming Protocol (RTSP), a new communications protocol for control and delivery of streaming media. RTSP supports the on-demand access of multimedia content such as real-time video, audio or any other type of time-based information. It also allows interoperability between client-server multimedia products from multiple vendors and can be implemented across virtually all common computer platforms.

According to Progressive Networks, RealVideo delivers "newscast-quality video" over 28.8 kbps modems, full-motion video over V.56 (56 kbps) and ISDN (64/128 kbps) modems, and "near TV broadcast-quality" video at LAN rates or broadband speeds (100 kbps and above).

On the client side, RealVideo offers interactive features such as video seeking and scanning, which — much like a VCR remote control — allows users to scan ahead to search for specific video content. A feature called "video mapping" allows Web programmers and developers to place videos within videos, adding greater interactivity and user control.

On the server back-end, RealVideo is scalable, allowing webcasters to deploy from several hundred to several thousand simultaneous video streams. Up to 500 video streams can be delivered at the same time from a single server. For larger deployments, several RealVideo servers "clustered" together can deliver thousands of simultaneous video streams.

**New technologies**

RealVideo, the company said, introduces new compression technologies for video and audio that offer a higher-quality experience than previously available. Full-motion video codecs are scalable for all bit-rates and optimized for the two most prevalent Internet connection speeds of 28.8 Kbps and 56 Kbps. The sound quality formerly associated with

streaming video is dramatically improved by RealAudio's 3.0 audio compression technology, plus three new low bit-rate codecs for voice and music.

Uncompressed NTSC video has a basic data rate of about 100 Mbps. Coding this signal for modem-based network connections implies a compression ratio of 5000:1. By comparison, audio is

**The sound quality formerly associated with streaming video is dramatically improved by RealAudio's 3.0 audio compression technology, plus three new low bit-rate codecs for voice and music.**

typically compressed at a rate of roughly 70:1 or less. "Clearly, the process of compressing video is challenging," Progressive Networks noted in a technical white paper.

"RealVideo's codecs offer new enhancements that deliver superior image quality at bandwidths that scale from 10 Kbps to more than 500 Kbps and are highly tuned for the bandwidth 'sweet spots' of 28.8 modems (20 Kbps data rate) and 56K modems/ ISDN (45 Kbps

data rate)," the company said. "Without sacrificing clarity, these codecs are able to default [to a] size that is 30 to 40 percent larger than first-generation video systems."

RealVideo's codec-independent architecture supports installable compression algorithms. RealVideo 1.0 provides two codecs: RealVideo Standard (developed by Progressive Networks) and RealVideo Fractal (using ClearVideo technology from Iterated Systems Inc.). Although

both codecs are general purpose, producers can choose the optimal compression for the content and delivery environment.

RealVideo Standard, the company said, is recommended for most low-bandwidth and Internet uses. RealVideo Fractal, on the other hand, is recommended for high bandwidth and frame rate applications where packet losses are expected to be low, such as corporate intranets.

C-SPAN announced it will use

## Spanish Successes

► SPANISH, continued from page 61  
beers, supermarkets and long distance companies."

What do Hispanics want to hear on the radio? Music, news and sports in their native tongue. Gordon Mason sees pros and cons to that. On one hand, he said, "It helps to preserve a culture, and we have a multicultural society."

But Mason said native-language programming could contribute to "separation," a feeling of "We stay here, and you stay over there."

Carey Davis said Hispanics are "assimilating, but not acculturating. They speak English at work, but at home it may be totally Spanish."

Mars defended Spanish-language radio stations, which in Los Angeles cater to an almost all-Mexican listening audience. "We fulfill a need for people who prefer and need information and music in Spanish. The Mexican culture here is so dominant ... the core language and religion, that you don't have to go out of the culture. In New York you do. Not here."

Heftel believes Mexicans are assimilating, but although they speak English at work, "at home parents want to keep their kids tied to their roots."

Heftel's three stations feature News/Talk, Adult Contemporary and regional Mexican music formats. One of the Liberman stations, KKJH, has a Talk/Comedy format. "It's lifestyle," said Mars. "We try to get people through the day."

In New York, WSKQ-FM is called Suave for soft music, while WPAT is

called Mega and plays music favored by people from Puerto Rico and the Dominican Republic. The L.A.-based stations broadcast exclusively in Spanish; the New York stations play



Carey Davis

some crossover hits. In a recent week, Toni Braxton had the number one song on Mega.

Whatever the format of their stations, the operators of Hispanic-targeted radio stations believe the trend toward more Spanish-language stations will continue as the Hispanic population grows.

"We hope to buy more," said Mars. He feels the climate is right, with Latino-owned businesses up 150 percent in Orange County over the past three years.

John Montone is a radio reporter for 1010 WINS(AM), New York. Send him e-mail at jfmontone@worldnet.att.net

RealVideo to broadcast more than 10 hours of live programming per day, seven days per week on the Web.

The Fox News Channel said it will use RealVideo to broadcast its cable news channel 24 hours per day for a two-week period, then broadcast selective programming later. ABC announced plans to cover eight weeks of pre-Oscar hoopla leading up to the ceremony using RealVideo. MGM announced plans to launch up to four video programs on the Web, the first called "True Crime Stories."

More information on RealVideo and the beta version of RealPlayer is available at <http://www.real.com>

Frank Beacham is a New York-based writer and producer. Visit his website at: <http://www.beacham.com>. Mail: 163 Amsterdam Ave. #361, New York, NY 10023.

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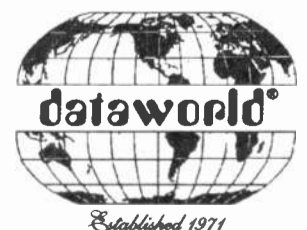
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## OFFBEAT RADIO

# Geller Was a Radio Original

Dee McVicker

Nine years ago this week, the late Simon Geller won a court battle.

To tell the story of Simon Geller is to tell the story of a radio station. It is hard to tell where one begins and the other leaves off, except Geller died this past summer, while his station, WVCA(FM), lives on as WBOQ(FM) in Gloucester, Mass.

But we're getting ahead of our story, which begins in the 1960s, when this broadcast engineer from Boston received a Class A FM license under an FM band rush similar to docket 80/90.

For the next 24 years, both Geller and his radio station lived in a two-room basement apartment, one the recluse, the other the effervescent socialite that beamed classical music on 104.9 MHz to the upscale community of Gloucester.

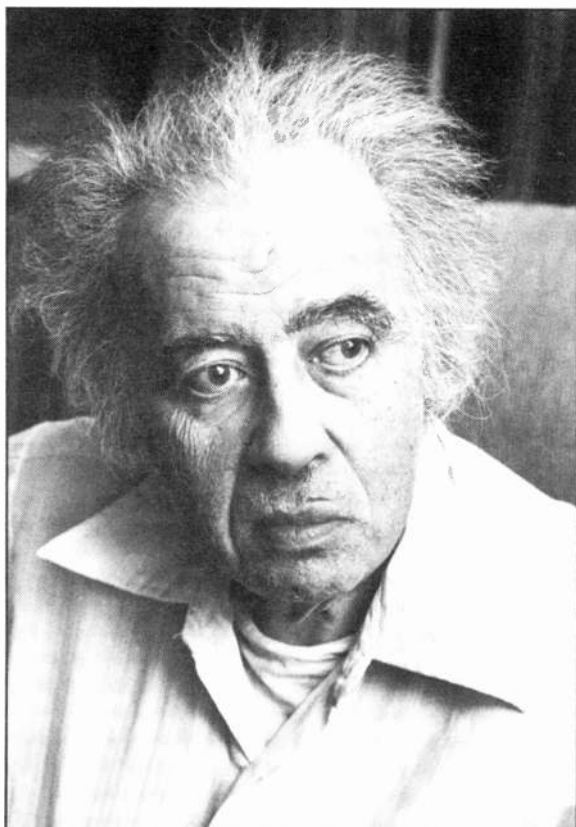
Geller was probably never as alone, or as accepted, as during these years.

Every morning, he would roll out of bed, walk into his living room and turn on his one-man radio station. He'd be at the mic or at the turntable or at the tape deck for 16 hours. In the early days, before Geller transferred all of his music to tape, he was known to excuse himself from the mic to go use the bathroom. It wasn't uncommon to hear a toilet flushing, or to hear Geller's ruminations during broadcasts.

"There were stories of him being on the air and people listening to an opera and behind it, there'd be, 'Damn it I burned the damn peas,'" said WBOQ General Manager Alan Tolz, who, like most everyone in the area, didn't know Geller but certainly knew of him.

The only time he left his apartment, near as anyone could tell, was when he went for the occasional haircut or to get a bite to eat. On those rare occasions, he shut down the station.

His was a crusty voice, not particularly suited to radio. He was often heard solic-



Simon Geller

iting money to meet this bill or that. "He would get on the air and ask people for donations, and he'd get ones and fives and tens, and on a lucky day he'd get a twenty or fifty," remarked Tolz.

He managed to run his station for 20-some-odd years on the generosity of his listeners, who numbered around 90,000 in 1988 when he sold the station. Only occasionally did he take in an advertising spot, when one could be had. Oddly enough for a broadcaster, Geller professed to dislike merchants, and even said so on the air, complaining periodically that the local restaurants used frozen seafood, for example.

Even more odd, he often said he disliked classical music, which melodiously

filled the air between his on-air ruminations. Years earlier, he had tried his luck at rock 'n' roll, and even hired a small staff to man the station, all to no avail. Having moved his station home, he changed the format to classical. It was an odd combination: Geller, the classics and Gloucester.

Someone once described him as something out of a fairy tale: a grouchy, eccentric little man who comes bearing beauty into the lives of others. Someone else described him as a stubborn individual, claiming that made him a thorough Gloucesterman. Which, for Geller, was the ultimate insult. He disliked classical music and the affluent community of Gloucester even more.

Geller never returned the affection of his local listeners and, indeed, rebuffed them on more than one occasion. In a much-publicized interview with ABC's World News Tonight, according to Tolz, Geller told an unsuspecting audience that

he never particularly cared for Gloucester and, having sold the station, was glad to be leaving the community.

## David beats Goliath

But even though he was a self-avowed curmudgeon and often antagonistic both on and off the air, the people of Gloucester loved him, if not for his individualism, then certainly for his stubbornness. It was well known in the area that the "Voice of Cape Ann," as he was sometimes called, was in an all-out war to save his station from a group of New England station owners who tried to take over his license. Starting in 1974 and for the next 14 years, the group claimed that WVCA violated FCC requirements for news, community

interest and public affairs.

"It was a real true-to-life David and Goliath situation. It was a rather large company that was trying to take the license away, some folks with a lot of money locally, and here they were, they were fighting this fellow who had really no resources to speak of, and all his legal work he was getting pro bono from a fellow in Washington, D.C. He fought this long battle.

**Every morning he would roll out of bed, walk into his living room and turn on his one-man radio station.**

"I think most people might have thrown their arms up and said 'forget it,' but he fought them and won," recalled Doug Tanger, one of the few who got close to Geller in his latter years ... close enough to purchase the station in 1988 for \$1 million.

On April's Fool Day that year, the 14-year battle ended in a federal appeals court. Geller finally won his station. But that same day, he called Tanger and announced he was ready to sell. Tanger was more than eager to buy. Having come from a family of station owners based primarily in Boston, he dreamed of returning to the North Shore and owning Geller's station.

For his part, Geller seemed to enjoy the one-upmanship of having finally succeeded in radio, according to Tanger, but he never really did enjoy his money. Geller moved to New York after the sale was finalized and, according to Tanger's recollection, "got a big radio and that was about it." He died last year, apparently from diabetes-related complications.

Geller's station, however, continues to live on as a classical station. After its purchase in 1988 by Tanger's company, Southfield Communications, WVCA became WBOQ ("W-Bach") and was moved to a new broadcast facility in Beverly, Mass. The format didn't change.

"I kept the format. Part of the attraction was that I thought he really had something there. Here was a radio station that was operated on donations only, for nearly 20 years. I thought that was better than any marketing study I'd ever seen," said Tanger.

Under Tanger's tutelage, WBOQ became a 24-hour station and expanded its classical repertoire beyond Beethoven to movie feature classics and common, modern cuts of the genre.

Ever the fun-loving station, WBOQ adopts many of the zany promotional antics of AC and rock stations, even broadcasting from Disney World. WBOQ was the Massachusetts Broadcasters Association's award winner for station of the year in 1994 and 1995.

In June 1996, Marlin Broadcasting, a classical music broadcasting company, purchased WBOQ for more than \$3 million. The company said it plans to keep the classical tradition started by Geller and nurtured by Tanger very much alive and well in Gloucester.

■■■

Dee McVicker is a freelance writer and regular contributor to RW. Reach her at (602) 545-7363, or roots@primenet.com



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PROMO POWER

# Sniff out That Format Change

Mark Lapidus

The death of a radio station format is a terrible thing to witness. If you've ever been part of a dying or dead property, you know the symptoms well. But if you haven't traveled through these treacherous waters allow me to explain that sad chapter in your life when well-meaning people keep saying: "Everything's fine! Research says the numbers will come back. We have the money for marketing. We can save this puppy. Just hang in there."

Many moons ago, a well-respected program director pal of mine told me that the average stay of a highly competent PD at a station is about five years. He should've known. This guy spent about five years at four different major market players. I have since noticed that it's not so coincidental that the average life of a format at any given outlet is about the same amount of time. Sure, there are many, many examples where stations have been in formats for 10, 15, even 20 years, but generally there is only one place to go after you've stayed at the top for a long time.

Signs, Signs

A demise will probably happen slowly. Like most things in radio, it isn't necessarily based on what you do.

**Competition:** Your end could begin when someone else decides to go after your audience. This station (or group of stations) doesn't even have to play the same music as you do. All they have to do is appeal to your people somehow. If you're a rocker, an FM talker may come on and slowly steal your TSL without playing one song.

**Morning Show:** Another culprit may be your loss of a long-standing morning show or the addition of a new morning show in the market. We all live for the time when our morning show outperforms the rest of the station. But it's a double-edged sword. A PD without an immediate plan to put in place after a morning show departs is asking for serious trouble. It's a fact: good morning shows get better offers.

When you're coming up on six months prior to contract renewal, and you're sensing something not quite right, start making moves to find alternatives. Don't wait until a month before a contract isn't signed to start looking.

**Music Problems:** Music burn is something else that you should find highly disconcerting. And yes, your particular type of music could burn out faster in your market than in another, even though the music is exactly the same. Don't believe me? Look at the Classic Rock format. It's fine in some markets. In others, stations have done too good a job playing the same 500 songs for seven years. If you have a station in an unrated market, you should keep your eye on a gradual drop in spot sales, attendance at your remotes/events and yes, even phone calls and letters from listeners.

"Okay, Mark," you say to me. "I've noticed a few of these things, so what can I do about it?" The first answer is to do everything better. Most of all, this includes long-range planning.

**Investment:** Let's take a worst-case scenario. A new competitor signs on with a better signal and programming at least as good as yours. Is it time to roll over?

Absolutely not! Break out the marketing money and protect your investment.

When new competition pounds you with television, direct mail and heavy contesting, don't kid yourself into thinking you'll stay on top because you "own the position" in the market. Radio station loyalty in most markets isn't what it was. People turn to radio for entertainment. Cable television (and now the Web) has taught them to like lots of options! Get out the checkbook. You're in for a battle. The good news is that, with proper marketing and solid programming, you can win the war.

*Loser or victor?* So, you didn't follow

the simple instructions above. What do you do? At this point, many operators will suggest a "re-launch." You may hear

## Everybody loves the new guy.

your consultant tell you to change a few things and put the word "new" in your name. If you're lucky, he may not torture you with the story about Tide succeeding by putting crystals in the soap and calling it "new." Hey, Tide was successful, right?

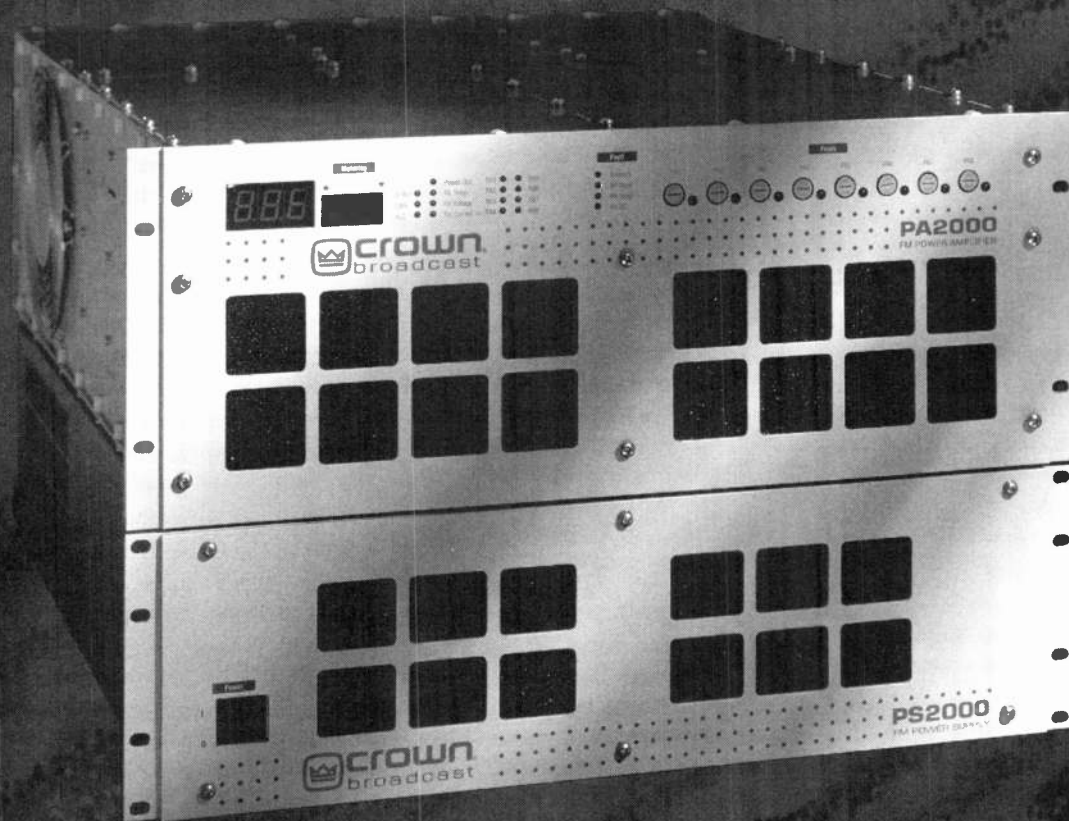
This is when it takes a confident general manager to stand up and say to the owner: "Let's be proactive. We should consider Country. I want to do a market search for a new format." Smart operators will pay for the research.

They know that new formats, done correctly, have a fast launch and even a honeymoon period with advertisers. Everybody loves the new guy. Few people, listeners included, will relate to the loser.

*Testing, One, Two ... Testing:* If you are considering a format change, take this easy test: Pretend you're a stranger to your own station. If you were to buy this radio station yourself, as the new owner, would you keep it the same or change it?

Life is change. And change is money. Be prepared. Eat your vegetables, and remember — the crystals in Tide won't save you.

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# Small Towns, Big Radio Baseball Dreams

John Montone

Phil Pepe, a former sportswriter for the New York Daily News and currently the morning sportscaster for WCBS-FM in New York, has witnessed many memorable baseball moments.

"I was at Yankee Stadium when Maris hit his 61st," Pepe said. He also had a press-box view of Reggie Jackson's three home runs in the final game of the 1977 World Series and Bucky Dent's shot over the Green Monster in 1978 that sent Boston into mourning.

But after tiring of the high-salaried big league stars, Pepe found his Field of Dreams in the broadcast booth of the New Jersey Cardinals, an A-ball affiliate of the St. Louis franchise.

They play their home games in the New Jersey town of Augusta, just a truck-pull away from the site of the annual Sussex County Farm and Horse Show.

Pepe does Cardinals' play-by-play and a post-game show on WNNJ-FM in Newton.

"The players are so eager to come on the radio, so cooperative," said Pepe, "compared to some major leaguers who think they're doing you a favor."

This will be Pepe's fourth year on the air, but only his third *inside* the booth.

"The first year we broadcast from the stands behind home plate," he said.

"One day a batter hit a line drive straight back at us. I dropped my pen and caught the ball. After the game the manager, Roy Silver, came over to tell me how impressed he was."

## Over the wall

Such is the intimacy of minor league baseball as heard on small-market radio.

Among the Cardinals' rivals are the Pittsfield Mets, whose games air on WBRK(AM) in Pittsfield, Mass. Play-by-play man Rick Stohr remembers his favorite call. It came on a Mets home run off a Pittsfield pitcher named Warden.

"Alert the warden," shouted Stohr, "Payton has just gone over the wall."

Stohr also called a triple play against the Watertown Indians and broadcast a game from the cradle of baseball, Doubleday Field in Cooperstown, N.Y.

It's the zaniness and home-town flavor of minor league baseball that veterans like Pepe and aspiring young play-by-play guys like Stohr love.

Stohr laughed as he talked about the Mets daily "dizzy bat race," in which "two kids lean over with their foreheads on the handle of their bat and spin in circles about a dozen times. Then they drop the bat and run. One usually falls flat on his face and the other wins a bag of Wendy's."

Speaking of food, Pepe was fed a steady diet by Cardinals fans. He decided to copy Yankee announcer Phil Rizzuto, who often asks listeners to send canolis, pasta, everything. It's almost like family.

It's also good business. Bob Shade, the sales manager and sports director at WBRK, notices quite a few fans at Wahconah Park wearing headphones listening to the Mets.

"And we have a lot of senior citizens in the area who can't go to many games, so they listen," he said.

Shade tries to sell his game spots in packages so they are more affordable to local advertisers.

"They get spots during the games and bonus spots during the day," he said.

Shade said that, even with major league Yankees, Mets and Red Sox games broadcast in the Pittsfield area, the minor league broadcasts are profitable. He attributes that to the close relationship between the game and the medium.

"Baseball is the only major sport where radio is the strongest medium. People still listen to baseball religiously on the radio."

## Helping each other

The Pittsfield Mets also use the radio station to promote the team, running promos for upcoming games and staging special events.

When playing the Batavia Clippers, the Mets held a "Clip the Clippers Night." A local hair salon sent its stylists to the game; fans got free haircuts during the game.

KTIK(AM) in Boise, Idaho carries the Boise Hawks, a Northwestern League A-ball affiliate of the Anaheim Angels. This is not an area of the country saturated with major league ball. KTIK General Manager Jeff Caves said, "The Hawks are the only game in town."

The station and the team are both owned by Diamond Sports, and the station broadcasts every game, home and away. Almost all the games are at night. That, said Caves, "is the most difficult daypart for radio."

Caves said it's not the games themselves that generate the revenue; it's the post-game show. "We've got 4,000 bodies in the car leaving the stadium listening to us."

All over the country, young men will be beating the bushes this spring and summer dreaming of a career in the big leagues.

It's no different in the broadcast booth. Rick Stohr has traveled by bus with the Pittsfield Mets to Ontario, Canada, to Erie, Pa. and to the Hudson Valley of New York. When the season is over he attends the baseball winter meetings to sell himself.

"Maybe get up to Double-A, then Triple-A," he said of baseball's tiered

minor league system. His voice trailed off. But he admitted he still thinks about broadcasting for his favorite team, the Red Sox.

"I still can't see myself doing anything else," said Stohr. "It's fun. This is the essence of baseball."

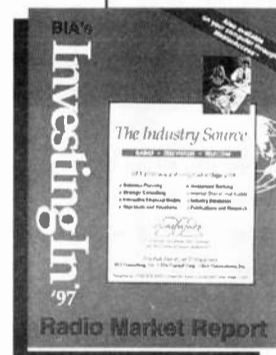
Phil Pepe agreed. "These kids are so enthusiastic. They all sign autographs." The veteran sportswriter and broadcaster, perhaps thinking back over decades in major league parks, said of his minor league gig, "It's a nice way to wind down."

■■■

John Montone is a radio reporter for 1010 WINS(AM), New York. Send him e-mail at [jfmontone@worldnet.att.net](mailto:jfmontone@worldnet.att.net)

## Investing In Radio

Here's a resource for radio managers: BIA Research Inc. is out with its *Investing in Radio Market Report 1997, 1st Edition*.



It profiles all Arbitron-rated markets with 1996 Fall ratings, and includes radio market financials, demographic and economic information, and maps with market boundaries. Competitive overviews list own-

ership, estimated revenues, and financial and ratings info for each rated station in the market. The annual edition costs \$405, or \$610 for all four editions throughout the year. BIA Research information is also available in database software formats. For information, call (703) 818-2425.

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## NAB Committee Member, Owner Alan Okun Dies

D.C. Culbertson

Alan Okun died suddenly at his home in Worcester, Mass. on Dec. 31. He was 44.

Okun was owner and general manager of two commercial stations in nearby Webster: WGFP(AM) and WXXW(FM). According to operations director Locke Lawrence, Okun bought news/talk WGFP about 15 years ago, and started up oldies WXXW about three years ago. Although Okun occasionally filled in on the morning talk show on WGFP, he did not have a regular air shift.

Prior to coming to Massachusetts, Okun worked in radio in Colorado. During the 1980s he was a dean at the University of Delaware.

Webster Town Administrator Mark S. Stankiewicz said Okun "was very active in community affairs" and his station "always had very good news coverage" of local nonprofit groups and town events.

His local civic involvement included membership in the Lions Club and the Webster-Dudley Chamber of Commerce, and most recently he served on a police chief search committee.

In addition to his local involvement, last year Okun was a member of the National Association of Broadcasters' Future of Radio Broadcasting Committee, which meets annually to make recommendations to the NAB board regarding technological and programming issues related to the future of the industry.

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**SONY**

# Buyer's Guide

Check out the latest products for the radio broadcast professional. See page 80

Radio World

Antennas, Towers & Cables

April 2, 1997

## USER REPORT

# ERI Comes Through for WRAY-FM

by Stephen R. Lankford  
General Manager  
WRAY-AM-FM

**PRINCETON, Ind.** During the summer of 1994, we discovered that WRAY's 43-year-old AM and FM tower needed to be replaced. This was going to be a difficult and complicated job. The city had encroached upon our once-rural site and we didn't want to lose any airtime during the transition.

We began our homework by investigating performance history of several possible tower and antenna companies. We quickly realized the difficulty in attempting to coordinate all the parts involved in an FM and AM tower installation. We concluded our best bet for a successful, on-time and on-budget completion was with ERI.

Although ERI is well-known for its antennas, we were less familiar with its

towers. Of particular interest was the welding process and the various methods employed to verify the accuracy and completeness of each weld. The paint booth was definitely state-of-the-art.

We spent considerable time with the RF engineers studying the lambda ( $\lambda$ ) antenna mounting system and what it could do for our signal. We discovered ERI puts a lot of engineering and experience behind each project. We were impressed. We wanted to build the new tower 8 feet from the existing WRAY tower. Like all broadcasters, we wanted to stay on the air during the project.

To further complicate matters, WRAY's AM-FM tower has several ancillary items such as ground radials, an ACU, isocouplers and all that stuff.

And herein lies the advantage of contracting through one company for the various components of the external trans-

mission system: ERI provided continuity in product development, availability, delivery and installation.

Its single-point accountability was crucial in avoiding the problems typically associated with a large and complicated construction project. All the loose ends were tied together and construction began during the summer of 1995. Foundations were poured and we ended up cutting a water line in the process.

After the concrete had cured, ERI began stacking its internal ring flange-guyed tower sections. Next came the Andrew transmission line and the new ERI SHPX series FM antenna. With this completed, we switched over to the new tower, then began the dismantling of the old tower (see picture).

We had underestimated the difficulty of this phase of the project. The old hollow-leg tower was showing the effects of 43 years of use. ERI provided on-site structural engineers to evaluate and then reinforce the old tower to prevent a premature collapse. We discovered the connection bolts were rusted into one piece. ERI had to use GAS-X type abrasive wheel saws to free the old bolts and dismantle the old tower sections. In light of these difficulties, the old tower was removed with only a minimum of business interruption.

However, the most important point to consider is the new antenna's performance compared to our old ERI FMC-6

antenna. The SHPX series antenna has much better impedance bandwidth than the older antenna and delivers a much crisper stereo sound to our area. Also, we didn't have to install radomes with the new antenna. Combining the SHPX antenna with the lambda mounting sections maintained the proper phase of the multi-bay, high-gain antenna and preserved the full power gain of the antenna — not possible when an antenna array is mounted on standard 20-foot tower sections. The use of lambda sections allowed ERI engineers to provide predictable antenna patterns that assisted in determining the most advantageous tower orientation to achieve maximum signal density in our licensed coverage area.

WRAY plays CDs live and processes audio digitally. We pay a lot of attention to our signal and sound. We feel the SHPX antenna and the lambda mounting system is the best on the market. The synchronous AM noise on our transmitter is continuously below -50 dB. Our signal is exceptionally clean and the reflected power is almost zero. We attribute this to a system that is designed, fabricated and installed well.

ERI did a superb job of building and installing our new tower, antenna and transmission facility.

It handled the project professionally and we are extremely happy with our crisp, clear FM signal. As station owners, we like dealing with one company to handle everything, particularly a unique project like this one.

For more information from ERI, contact the company in Indiana at (812) 925-6000; or circle Reader Service 127.

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## USER REPORT

# Woodward Towers Over the Competition With PiRod

by Steve Brown  
Chief Engineer  
WHBY (AM)-WAPL-AM-FM-  
WKSZ (FM)  
Woodward Comm. Inc.

**APPLETON, Wisc.** A decade ago, FCC Docket 80-90 forced many owners of existing FM radio stations to make tough choices when faced with the FCC's "use it or lose it" philosophy. I am the chief engineer for WAPL-AM-FM, a station faced with such a choice in the mid-1980s. Our parent company decided to upgrade WAPL's tower to preserve its full Class C status.

On several occasions, I called to get details about a tower at a station where I worked part time, and I asked about possible additional loading of the tower. PiRod personnel were the most friendly and courteous. Similar questions put to other vendors were

usually met with a less than enthusiastic response, accompanied by an immediate request for a large, up-front fee for a complete re-analysis of the tower.

The next phase of my research involved the polling of people who really knew a lot about a lot of different towers, the guys who put up and serviced towers for a living. You can believe I uncovered strong opinions from this group. Most riggers had a lot of respect for PiRod as a manufacturer.

What made the PiRod tower stand out from the rest? First of all, the tower was constructed of solid-rod round steel members. While this is more common today, 10 years ago quite a few towers were still made with hollow or pipe members, especially in the legs. This saved a lot of weight, but I was familiar with

See RESEARCH, page 73 ▶

# Research Paid Off

► PIROD, continued from page 72  
several installations in which the hollow legs deteriorated from the inside out. This meant that a regular visual inspection could not detect the inside deterioration when it began, forcing replacement of the tower before its useful life should have been over. Because a large tower is such a long-term investment, I was not comfortable with purchasing a tower with pipe or hollow leg members.

Second, the PiRod tower was made of sections welded as complete units. Contrast this approach with that of several manufacturers that supply tower sections partially "knocked down," requiring the tower erector to assemble or bolt up the tower in the field. I was familiar with one job where a crew's mistake on site needed to be corrected later at great expense. The crew installed some of the tower members upside down, compromising the integrity of the structure. Each incorrectly installed member had to be removed and re-installed, a complicated job on the now-completed, loaded structure.

A completed welded section seemed to be a better idea, and would also cut down on installation time. Then I looked at the sections themselves. The PiRod tower used a "plug and socket" type of assembly technique to join the sections, which seemed inherently stronger than bolting flanges together on many other towers.

And the welds! The welding on the PiRod tower sections was much more substantial than that on the competing towers. There was often a triple bead weld on critical joints. In general, the construction of the PiRod tower was visibly more substantial than many of the competing products.

In the end, the PiRod pricing was in the middle of the pack. There were a few higher bids, some from a couple of "Cadillac" level vendors. But it seemed to me that PiRod represented the best value of all the competing vendors.

Since this project was completed in 1988, the 1,040-foot tower for WAPL has served well. Many rental antennas have been added, helping the station's bottom line. I have been involved in several more tower projects, and PiRod always provides a competitive bid. I believe that a PiRod tower is an excellent value for the money, and worthy of consideration for your next tower project.

For more information from PiRod, contact the company in Indiana at (219) 936-4221; fax: (219) 936-6796; or circle Reader Service 134.

USER REPORT

# Collaboration a Success at Network

by Amador S. Bustos  
President  
Z Spanish Radio Network

**SACRAMENTO, Calif.** Four years before Congress passed the 1996 Communications Act, Z Spanish Radio Network Inc. began the task of building a nationwide network of radio stations to serve the needs of the North American Hispanic Community. The network's staff soon discovered that many of its acquisitions came with technical problems that previous owners could not resolve.

These included a range of problems, from poor coverage to interference problems and dangerously high RFR levels.

In a few cases, a new frequency and/or a new transmitter site might solve the problems, but at substantial cost.

In other cases, no satisfactory solution seemed available, at any price. Considering the millions of dollars invested in these stations, solutions had to be created. To say that we needed our engineering department to work miracles is perhaps an understatement. I am pleased to say that most of these problems have been resolved.

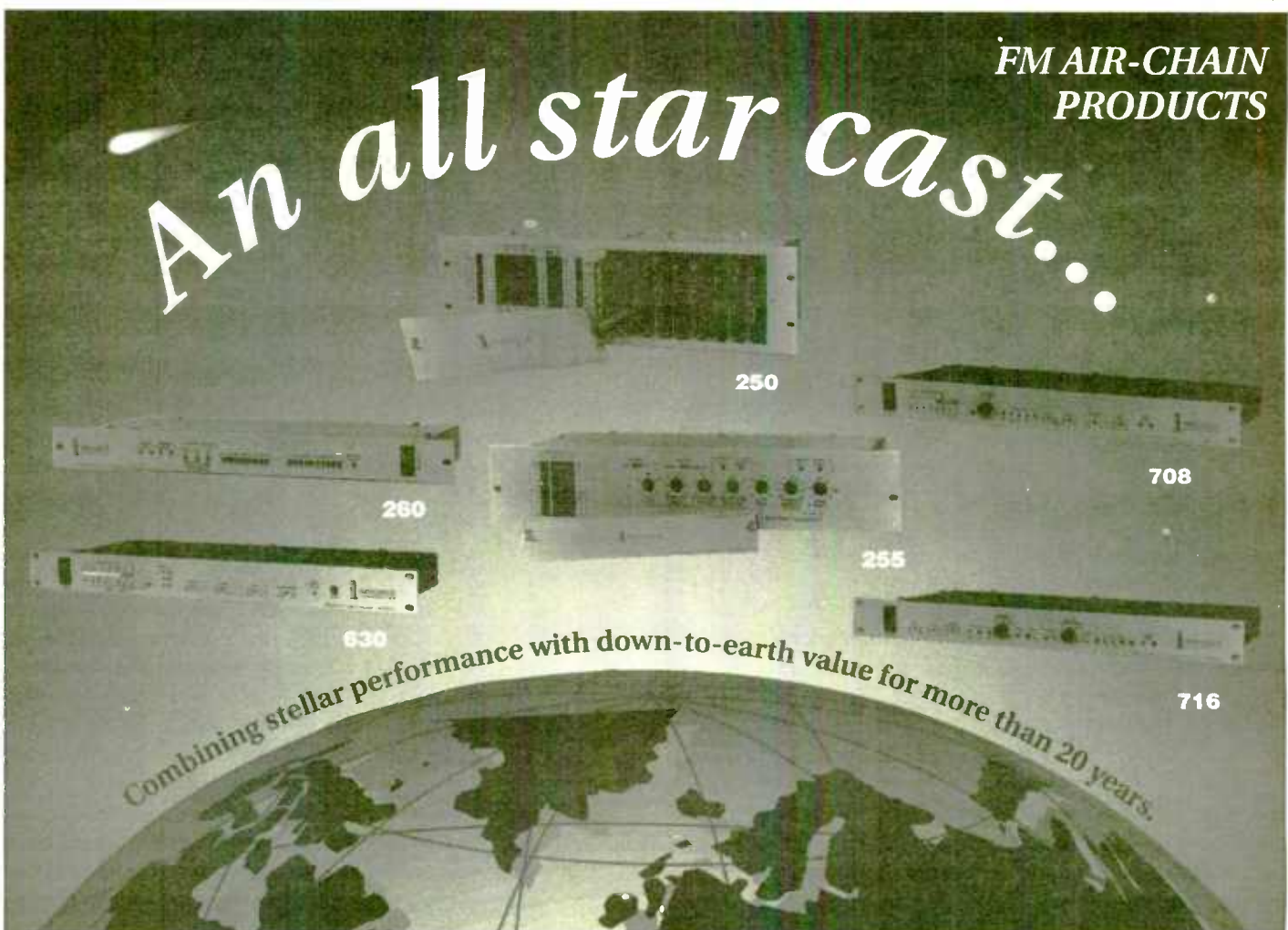
In my view, one of the most significant improvements accomplished by our engineering involves a new type of FM broadcast antenna that was developed for our stations.

This was a joint effort by our director of engineering, Lee Granlund, antenna consulting firm Micro-Tech Engineering, and a broadcast antenna manufacturer, **Antenna Concepts** of Diamond Springs, Calif.

Two years of development and testing have produced excellent results, including high performance antennas for four California FM stations. Several others are now in design stage or under construction.

This new antenna, the "Ultra Tracker," was originally designed to eliminate RF Radiation (RFR) and RF Interference (RFI) problems where the FM transmitter site is located in a residential area or other

See NETWORK, page 79 ►



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## USER REPORT

# Market Teeming With FM Antennas

by W.C. Alexander

**DALLAS** There are numerous FM antenna designs available on the market with differing characteristics. Some common FM antenna types are the panel with crossed dipole, ring stub and twisted ring, and multi-arm short helix. There are several variations on these basic designs, some of which have become quite refined over the years.

Antenna gain is achieved by vertically stacking multiple antenna elements or "bays" at full- or half-wavelength spacing on a common feed. A single bay operating by itself usually exhibits a neg-

ative gain over a half-wave dipole in free space, while two bays usually provide near-unity gain. More than two bays will exhibit a positive gain, and gains of up to seven are possible with an antenna with 12 bays.

### It's a match

Matching is an important consideration in FM antenna arrays. The simplest and perhaps most common way uses a three-stub transformer. This matching section is inserted between the transmission line and the antenna interbay line, and is adjusted for minimum reflected power to the transmitter. The net effect of

this matching scheme is to place an impedance in parallel with the antenna impedance to match it to the 50-ohm line. The disadvantages of this method are that it is bandwidth limited and it produces standing waves within the interbay line.

A better — although more costly — matching scheme involves manufacturing the antenna bays themselves so that the individual bay impedances are resistive and equal to 50 ohms times the number of bays for an end-fed antenna, or 50 ohms times half the number of bays for a center-fed antenna. This is achieved by performing an impedance transformation in the horizontal portion of each bay.

This matching scheme is technically superior to the transformer approach for several reasons. First, it eliminates standing waves in the interbay feedline. Second, with no transformer section and its associated high reactances and voltages, the antenna can withstand higher input power. Third, it results in a matched system, where the feedline impedance is matched from the point of connection to the transmitter all the way to each individual antenna bay. A means of fine-tuning out reactances is provided by a ceramic stud or collar on the inner conductor near the bottom of the antenna or power divider.

One of the more critical specifications of an FM antenna is the VSWR bandwidth. It is important that an antenna exhibit a VSWR of less than 1.08:1 across a bandwidth of at least 260 kHz for proper system performance. A narrowband antenna can cause synchronous AM and can also lead to crosstalk between the sub- and main channel as well as phase distortion of the transmitted signal. The resulting on-air sound of the station, particularly in areas where multipath is prevalent, will be degraded by a narrow VSWR bandwidth.

Some antenna designs are inherently broadband, with up to 20 MHz of bandwidth for some community panel antennas and 4 MHz for some types of single-user antennas. Broadband antennas have a great advantage over more narrowband designs. They are much less likely to cause synchronous AM and phase distortions, and in many cases, deicers are not needed.

**Keep in mind that high initial cost may be offset by many years of low maintenance costs.**

Deicing equipment, either in the form of electric heat or radomes, tend to increase the complexity, cost, required maintenance and weight of an antenna. When ice forms on an antenna, the resonant frequency of the antenna tends to go down. A narrowband antenna with even a small amount of ice will present an unacceptably high VSWR to the transmitter, possibly leading to damage not only to the transmitter but also to the transmission line.

### Prevent detuning

Deicing equipment keeps ice from forming on the radiating elements, thus preventing this detuning. Broadband antennas, while detuned by ice just as more narrowband designs are, have sufficient bandwidth that the detuning has little effect on the load presented to the transmitter.

Keep in mind that high initial cost may be offset by many years of low maintenance costs. The converse is also true. When selecting an antenna, the best approach is to select the best antenna that your budget can stand. After all, what other part of your transmission system has more effect on the signal you present to your audience?

■■■  
Cris Alexander is director of engineering for Crawford Broadcasting in Dallas. He writes regularly for RW. Contact him at (214) 445-1713 or via e-mail at 76440.1670@compuserve.com

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The **SOURCE** selector lets you send a 440Hz tone or the signal from the Qbox's built in condenser mic back to the main console at +4, -20 or -50dB levels. The **SPEAKER** selector lets you test dynamic mics and confirm mic or line level signals.



## USER REPORT

# Specialty Product Odds & Ends

by Troy Conner

**BRASSTOWN, N.C.** Because this Buyer's Guide focuses on towers, transmission lines and antennas, the editors of **RW** asked me to write a brief article out of my normal monthly sequence of "Man of Steel" columns. I have chosen to provide a short list of specialty products. Some of these are relatively new, while others are established, older designs that have changed little over the years.

## Tower registration and signs

By now you are probably aware of the tower registration efforts by the FCC that began late last summer. I was unaware until recently of the requirement that the assigned seven-digit FCC registration number be displayed at the base of any structure greater than 200 feet tall.

Once you have submitted Revised Form 854 to the FCC and received a number, you may want to contact Thomas Moyer of ID-ER Antenna Products at (610) 458-8418. His company produces custom tower registration signs approved by the FCC that meet current Part 17.4(g) rules.

In addition, ID-ER Antenna Products also sells two other products — ID-ER tags and bands. They are designed to reduce potential confusion by individually identifying multiple transmission lines and waveguides. The tags come in packages with sequential numbering so each T-Line on a tower can be identified at four distinct locations.

The tags are designed to be attached to smaller heliax-style lines with the supplied cable ties, or slipped over smaller 1/2-inch lines and 5/8-inch lines,

commonly used by tower tenants. I can attest that when you are dealing with wads of transmission lines on a lease tower, tracing lines can become a problem. This should not really be unexpected, considering that most times the station engineering folks are non-climbers and are therefore unfamiliar with the actual routing of lines. This problem is exacerbated further if the lines were not neatly put up, and are tangled or intertwined.

The ID-ER bands are a bit like oversized wire ties. They are 1-1/2 inches wide and 13-1/2 inches long. They are specifically designed to wrap around small 3-inch rigid or heliax transmission lines, common in many FM applications. The bands can be marked with up to seven letters and/or numbers and are available in six colors for identification.

While we are on the subject of marking and signs, keep in mind that OSHA, ANSI and the FCC also require that non-iodizing radiation warning signs be posted around the base of the structure. I am sure a number of companies produce these, and many more distribute them, but I am familiar with only these two: EMED Co. Inc. at (800) 442-3633 and Stonehouse Signs Inc. at (800) 525-0456.

## Beacon bulbs

If you have a red lighting system you should know some of the basics. A standard type L-864 red beacon light, one that flashes, uses a pair of large, 620 W, bayonet-specific "code book or aviation" bulbs. Specifically, you are looking for the ones with a MOG-PF-type base. This stands for Mogul Pre-Focus; this is in relation to the location of the filament in relation to the bulb base. Most of the major light bulb producers make a beacon bulb in either 120 V or 130 V versions. Surprisingly, I can normally find these as easily in small towns as in major cities.

## Obstruction lights

The non-flashing, intermediate lights are known as type L-810 obstruction lights. There are usually two or three fixtures at each level and they use a single 116 W bulb. Again, any patient sales person at an electrical supply house will be able to find these bulbs in its catalogs. Often the bulbs are referenced by the word "traffic," because apparently these same bulbs are used in some street lights. These bulbs are clear and look just like a standard screw-base light bulb.

## Good grounding

I don't know much about this next product, but it sounds like such a neat idea I have to mention it. Lyneole XIT Grounding, at (800) 962-2610, designs and manufactures a low-resistance grounding system.

As best I understand it, here's how the system works: a vented hollow ground rod draws and expels air based on temperature, atmospheric pressure and wind.

See ODDS, page 79 ▶

## SPECIAL REPORT

## Belden's Cable Solution

**RICHMOND, Ind.** When most broadcast engineers think of antennas and transmitters, they think of hard-line or helical-design flexible corrugated transmission lines. These products are the standard for most broadcasters. However, there are many areas where these designs are overkill, expensive and difficult.

Any transmitter-antenna combination has to overcome the loss (attenuation) of the cable between them. Cable loss can be compensated with transmitter power or antenna gain. As long as you end up with the desired effective radiated power (ERP), your system will perform as required.

### Alternatives

The total attenuation of any cable is determined by the loss per unit (foot or meter), multiplied by the total length of the line. A long line usually requires a lower-loss larger-diameter transmission line just to overcome the length of run, regardless of the power required. A transmitter with greater output power may be substituted, with the excess power used in the added loss of the smaller transmission line. In the latter case, the power company is the real winner.

However, where moderate power (under 1 kW) and moderate lengths are required, there are alternatives to solid or helical-design transmission lines. One of these alternatives is Belden 9913F. Based on the Belden 9913 design, the "F" version indicates one of its many features: flexibility.

Belden 9913 features a helical construction, much like its bigger cousins. This means that much of the interior is hollow. In outdoor applications, poor termination or damaged cable jacket may allow water inside the hollow area of this cable, rendering it useless. Belden 9913F uses nitrogen gas injected foam polyethylene dielectric, replacing the hollow tube with a completely filled interior, eliminating this problem. Originally applied in the cable television industry, gas injection is already used in many of Belden's digital video

coaxes. Now this technique has made its way to RF transmission lines as well.

Gas injected foam is capable of much higher velocities compared to traditional chemical foam technology. These velocities can be comparable to the air gap dielectric designs such as 9913. Additionally, the gas injection process has a negligible residual effect as compared to the chemical foaming process, improving the overall dissipation factor of the dielectric material. This helps to make 9913 and 9913F almost identical in high frequency attenuation values.

Besides the dissipation factor, old-style chemically-foamed cable typically suffers from another problem: center conductor migration. Because the elasticity of the conductor material and the polyethylene is quite different, over time the conductor tends to creep or cold flow through the polyethylene. Conductor migration is accelerated when the cable is installed with a tight bend radius continuously flexed or exposed to elevated temperatures.

This migration would radically alter the impedance at that point, causing serious SWR, and dramatically reduce the voltage-breakdown ratings. The poor mechanical performance can be attributed to the materials used, typically low- or medium-density polyethylene.

### High-density polyethylene

Belden 9913F uses gas-injected foam high-density polyethylene. The foam cell walls are more uniform and stiff, resisting center conductor migration and maintaining an impedance tolerance for 9913F of  $50\Omega \pm 2\Omega$ . The construction consists of a highly stranded center conductor for improved flexibility and better approximation of solid conductor electrical characteristics. Additionally, the jacket is Belden's Belflex compound for low temperature flexibility and ruggedness.

Where high power handling is not an issue, such as receive antennas,

Belden 9913F could be an ideal choice. In these applications, attenuation is the critical factor. However, comparing the cost benefit of 9913F to helical-design corrugated transmission lines may more than offset any increase in attenuation.

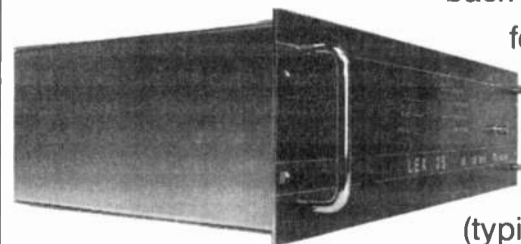
An ideal application for Belden 9913F would be ENG, where communications links or microwave (below 4 GHz) applications are common.

Other applications include RPU and especially where antenna cables are continually coiled and uncoiled; FM translators or boosters; cellular base station equipment; low-power television and FM; emergency back-up systems; 50 $\Omega$  receive antennas; and for wireless microphone receivers, especially those with extended diversity antennas.

For more information from Belden Wire & Cable Co., contact the company in Indiana at (317) 983-5200; or circle Reader Service 136.

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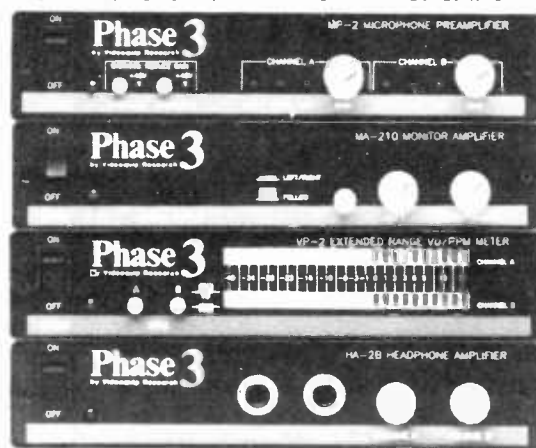
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USER REPORT

# Cortana Offers Solid Protection

by Steve Nelson  
Director of Engineering  
WBNX(TV)

**CLEVELAND** After completing a 1,131-foot tower and working in the transmitter building on equipment so that we could start broadcasting the following week, we experienced an unusually severe thunderstorm through our area. I use the term unusually severe, because when one is standing inside a building that has foot-thick walls and a 3-inch "parking deck" roof, one does not normally even hear storms.

I opened the door and stepped out in time to see a bolt of lightning streak across half the sky and hit its target — a tower — like an arrow hitting a bullseye. That tower sits about 1,800 feet north of mine. The following day I heard that the that had "gone down" and spent quite a few dollars to get back up again. I also found evidence that my tower had also taken at least one hit. All six #4 ground wires at the bottom of the tower were very discolored and some crystallized.

We had used "slag" to fill around the tower base and ice bridge. This contains iron and showed signs of "track marks"

burns and other discoloration from the lightning as well.

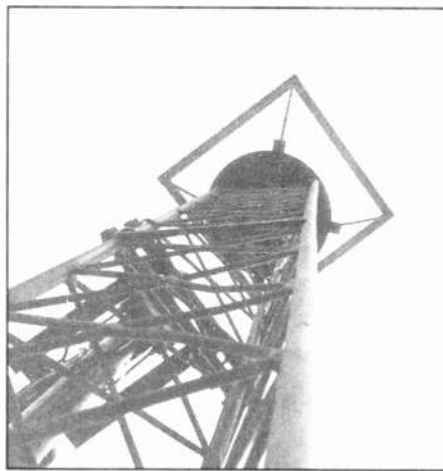
I called my friendly local tower company, Warmus and Associates in Bath, Ohio, which had built my tower, and discussed the alternatives.

I had spent many hours of planning and made a careful installation to obtain the best grounding system for this site. This included three 8-foot ground rods at the tower base and six 8-foot ground rods on each side of the ice bridge to the building, connected together with #4 copper "cadwelded" to each ground rod.

This divides the current as it travels toward the building. It has worked quite well; there is no evidence any surges ever made it into the building.

But I still had the tower and antennas to worry about. I ordered the Cortana "Stati-Cat" with cross bar for the top and "Stati-Tomeats" for the sides and "Stati-Kitty" for the top two sets of guy wires. These units consist of a stout 6061-T6 aluminum bar stock with several hundred 1/8-inch stainless steel spikes, which are pressed through the aluminum to produce "points" on both sides of the bar.

As the "crows nest" is assembled, the points are bent slightly to produce a por-



Cortana's Crows Nest helps protect from lightning strikes.

cupine effect with points evenly arranged all the way around the structure. The idea is that a sharp point will start an arc or discharge at a much lower voltage than a blunt object.

The goal with the tower is to create as many sharp points to dissipate the voltage before it becomes high enough to cause a full-blown strike.

The Stati-Cat creates a full nest of points above the top beacon and protects the top of an antenna from voltage buildup, but on tall towers the structure is so massive that other areas may still build up too high a voltage gradient and cause a strike on the side of the tower. The guy wires are attached with swivel joints and do not provide a good conductor between the tower and guy wire.

The solution to this is the Stati-Kitty. It looks like a wire "fuzz ball" with 8-inch strands of stainless steel wire in all directions.

This is clamped to the guy wire close to where it meets the tower, and bleeds voltage off the guys.

The final step is mounting the Stati-Tomeats along the tower legs at two-thirds height and at one-third height on each of the legs. These are 36 inches long and contain 180 points each. My tower

was "topped out" in March and the Cortana system was installed in July.

**Solid protection**

While no system can guarantee complete protection from lightning, this is as good as it gets. I can find no evidence of lightning strikes after the installation of the Cortana system.

My tenants have been pleased and no one has had lightning damage on this site. I've been off the air because of power failures, but when the power comes on, all I have to do is turn on the transmitter again. Now if I can only convince the owner to buy a generator with the money saved. But that's another story.

For more information from Cortana, contact the company in New Mexico at (505) 325-5336; or circle Reader Service 98.

TECHNOLOGY UPDATES

SWR

**Ebensburg, Pa.** S.W.R. is Systems With Reliability. The firm began as a service company, supervising the installation of transmission line systems across the country. After installing and working with all types of rigid coaxial line, the founders felt that broadcasters were not getting the performance from these systems that their investments called for.

S.W.R. joined field expertise to a research and engineering effort that resulted in a patented new flange and inner connector. The same engineering is used in the manufacture of its antenna and waveguide systems.

The Thermo-couple rigid coaxial line, otherwise known as K-line, began a series of firsts for S.W.R. The gendered design of the K-line flange means an S.W.R. male flange always faces toward the antenna on the upper portion of the line, and the female flange always faces toward the transmitter on the lower portion of the line. This must be kept in mind when ordering flanges for field cuts.

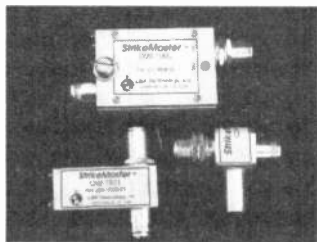
S.W.R. will build field adapters to enable the flanges of any manufacturer to mate up with its products.

S.W.R. inner conductors use Teflon pins spaced one-quarter wavelength apart for optimal efficiency for whatever frequency or channel ordered.

For more information from S.W.R., contact the company in Pennsylvania at (814) 472-5436; fax: (814) 472-5552; or circle Reader Service 96.

LBA TECHNOLOGY

**GREENVILLE, N.C.** LBA Technology Inc. has announced the introduction of a broad line of quarter-wave stub lightning arrestors. The StrikeMaster is available in standard models from as low as 130 MHz up to 3000 MHz. Three available physical packages permit users to choose the most convenient configurations for field installation or OEM application.



Incorporating a proprietary bandpass design, the StrikeMaster also offers valuable benefits to protect users against unwanted interference from collocated transmitters. The StrikeMaster rejects out-of-band signals, protecting users from intermod and defense problems found at crowded PCS/cellular collocation sites.

Constructed of low-loss, silver-plated components with no internal compression joints, the Strikemaster line offers solid intermodulation performance. The StrikeMaster's unique quarter-wave system provides a direct DC ground to the coaxial line center conductor while passing signals with minimal distance. Unlike gas tube arrestors, power capacity is limited only by the connectors, with no need for periodic maintenance.

For more information from LBA Technology Inc., contact the company in North Carolina at (919) 752-0279; fax: (919) 752-9155; or circle Reader Service 97.

TECHNOLOGY UPDATE

PROPAGATION SYSTEMS

Propagation Systems Sets Up Shop

A new antenna manufacturer is in business and seeking FM and TV customers.

Propagation Systems Inc. is based in Ebensburg, Pa., and is headed by Douglas Rose, former director of engineering at SWR.

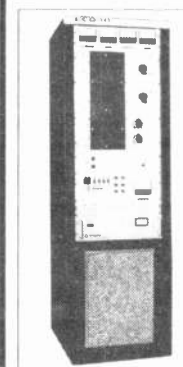
Other stockholders are Michelle S. Marti, daughter of George Marti, and Melvyn Lieberman, a consulting telecommunications engineer.

The company offers a line of broadcast antennas for high- and low-power FM, as well as TV and STL dishes.

PSI will also install a calibrated test range for optimizing and directionalizing antennas. The company is exhibiting at NAB in booth S5468.

For information, contact PSI in Pennsylvania at (814) 472-5560; fax to (814) 472-5676; or circle Reader Service 129.

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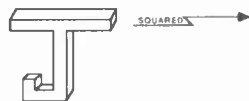
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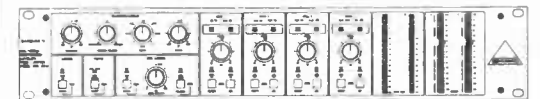
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**TECHNOLOGY UPDATE**

**MYAT**

**NORWOOD, N.J.** Design engineers' options for high-power, medium-wave transmission lines have just broadened. MYAT's 12-inch transmission line is available in both 50-ohm and 100-ohm impedances.

The 12-inch, 50-ohm line (model series 1211-XXX) has a peak power rating of 5.5 mW (2:1 safety factor) with attenuation of .00024 db/100 feet at 1 MHz. The 12-inch 100-ohm line (model series 1281-XXX) has a peak power rating of 4.3 mW (2:1 safety factor) with attenuation of .0022 db/100 feet at 1 MHz.

Both lines use aluminum outer conductors with EIA-type bolt flanges. Inner conductors are high-conductivity, hard-drawn copper, and feature a high-current anchor connector system for expansion compensation.

Line sections are supplied in lengths of 38-1/2 feet. Expansion boxes are used to compensate for thermal expansion on long horizontal runs.

A complete line of elbows, gas barriers and suspension accessories are also available.

For more information from MYAT Inc., contact Rita Stange in New Jersey at (201) 767-5380; fax: (201) 767-4147; or circle Reader Service 100.

**Man of Steel's Short List of Must-Haves**

► ODDS, continued from page 75

The air "pumped" into and out of the rod carries some moisture. This moisture is then absorbed by a metallic salt known as Calsolyte, which partially fills the rod. As the airborne moisture is absorbed and forms droplets, it naturally drips to the bottom of the tube.

**Future Articles**

The electrolytic solution then overflows the drain holes inside the tube and is subsequently absorbed into the Lynconite clay backfill material. Over time, as the salt solution osmotically leaches into the surrounding soil, it creates electrolytic roots, the essence of the Lyncole grounding process. Note that the system remains moist, and thereby more conductive.

In the future, I plan to toss in this type of product listing occasionally. Give me a call or drop me a fax if you run across a neat tower-related product, or if you want to know more about a particular topic. In the next "Man of Steel," we'll talk about tower inspections.

Troy Conner is the owner of Tower Maintenance Specialists. Reach him at (704) 837-3526 or via fax at (704) 837-1015.

**New Era For Network**

► NETWORK, continued from page 73  
critical environment. This was accomplished by eliminating "side lobes," reducing the amount of RF energy below the antenna by at least 99 percent.

It must have worked, because we no longer get calls from neighbors, who had complained of "Spanish music and talking" on their phone lines, as well as moderate interference to television reception near our transmitter sites. (This is important because of new federal, state and local laws regulating allowable RF Radiation limits in occu-

ried areas. Some stations may have to move or shut down.) But this improvement is not the most significant virtue of the new Ultra Tracker FM Antenna. For me, and for the Z Spanish Radio Network, the major factor is improved signal coverage.

We are not talking about increased average signal strength, as that would indicate a power increase not authorized by the FCC. We are talking about a more consistent signal, with smaller variations over a given area.

We are talking about a major

reduction in "multipath" problems, and a significant improvement in building penetration. Our flagship station, KZSA(FM), now covers 26 twisting miles of the American River Canyon with only 1.4 kW ERP, and no multipath.

These are the factors that set the Ultra Tracker apart from other FM antennas, and they are the reasons why we plan to install new Ultra Tracker antennas for almost all of the Z Spanish Radio Network FM stations from coast to coast.

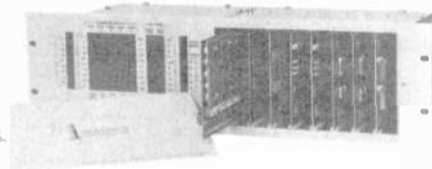
For more information from Antenna Concepts, contact the company in California at (916) 621-2015; fax: (916) 632-3274; send e-mail to: sales@antennaconcepts.com; or circle Reader Service 99.

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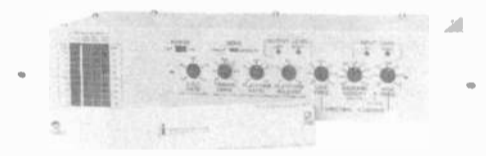


**250 - Programmable 5-band Stereo Processor**

Gated AGC, 5-band Compression and EQ, split-spectrum Limiting—all with colorless, quasi-digital PWM gain control. Manually pre-program several processing presets or place the unit entirely under RS-232 control.

**255 - "Spectral-Loading" FM Processor**

A very aggressive Tnband-PWM Stereo Processor tailored for contemporary music formats. Broad parameter control over the gated AGC and 3-band Compressor/Limiter.



**260 - FM/TV "Utility" Processor**

Stereo "gain-riding" AGC and a split-spectrum Compressor/Limiter control average and peak levels. Ideal for TV-aural and budget FMs.

**716 - "DAVID-II" FM Processor / Stereo Gen**

A tight, smooth AGC/Compressor/Limiter coupled with clean Digital Synthesis of the multiplex baseband signal. Also features internal RDS/SCA combining and a built-in Composite Processor. Outstanding, affordable performance has made "DAVID-II" a popular and legendary product.



**708 - Digital Synthesis Stereo Generator**

A basic Stereo-Gen with impeccable specifications. Includes front-panel metering, internal subcarrier combining and a built-in Composite Processor.

**530 - Off-Air FM Modulation Monitor**

Accurate, easy-to-read display shows total modulation, pilot injection, stereo separation and crosstalk, RF signal strength and multipath distortion. Alarm outputs for overmodulation, carrier and program audio loss. Eight station presets facilitate quick modulation comparisons.



**630 - FM "Relay" Receiver**

A professional receiver for translator (re-broadcast) and other demanding off-air pickups. Features composite MPX and balanced stereo program outputs, synthesized tuning, selectable bandwidth, metering, alarms and remote control.

**710 - RDS Encoder**

A PROM-based "static" RDS/RBDS Encoder. Very easy to set-up and use without the need for a host computer! 15 separate memory "frames" may be programmed with station and program ID codes, service flags and radiotext messages. May also be used with a PC for song titles, promos, etc.



**510 - RDS Decoder/Reader**

Use with any mod-monitor to decode and display all RDS/RBDS data groups, and to measure subcarrier injection level with digital precision. An RS-232 interface allows data archiving and analysis.

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Marketplace, Radio World, Managing Editor, P.O. Box 1214, Falls Church, VA 22041.

## PR&E Modular Cabinetry line

Pacific Research & Engineering (PR&E) adds a new modular cabinetry line called Quikbilt designed especially for small- to medium-market radio stations.

The cabinetry has high-pressure laminate on its work surfaces and 3/4-inch thick thermal-fused melamine panels with 45-pound particle board substrate on lower cabinet casing. Features also include: Mod-eez invisible fasteners, front and rear air ventilation, and Euro-clip hinges with quick-release cam fasteners.

The furniture modules are shipped flat-packed via UPS and the entire studio cabinet can be assembled in a few hours.

For more information from Pacific Research & Engineering, contact the company in California at (619) 438-3911; or circle Reader Service 120

## Digigram to Launch PCXpocket

The first Type II PC Card to be used for professional sound recording and editing applications on a laptop will be



introduced at the NAB Convention in Las Vegas.

When used with editing software,

Digigram's PCXpocket adds a full digital audio workstation to the laptop's other capabilities. Audio segment transmission is possible with a modem or ISDN terminal card.

The advantages of Digigram's PCX digital audio boards are available with this card. It operates in both PCM-linear and MPEG audio compressed modes for coding, processing and decoding in real time.

For information, contact Cowan Communications at (202) 728-0121; fax (202) 728-0029; e-mail to cccoms@aol.com; or circle Reader Service 102.

## Prophet Systems Module Debuts

Multiple stations running Audio Wizard CFS from Prophet Systems can now automatically share spots and songs totally in the background, thanks to the company's new multi-market audio transfer module.

The company calls it a "tremendous plus" for groups that wish to share talent among all of their stations.

System features include a revamped control room screen, exclusive automated time announcements and backtime modules, and full log-in and password security and tracking to protect data.

The Windows 3.1- and Novell-based system is a stable, flexible system with instant Dolby AC-2 and MPEG audio access, live or automated operation, central file storage and Pentium computers. It can run more than 10 radio stations and support more than 100 workstations.

Also new from Prophet: Digital Station Monitor, which monitors and records off-air signals for later retrieval. It's a useful tool for sales and promo departments. The company will show its products at NAB booth 4106.

For more information, contact the company in Nebraska at (800) 658-4403 or via fax at (308) 284-4181, or circle Reader Service 103.

## New STL, Uncompressed Audio

Harris Corp. is using NAB '97 to debut CD LINK, a 950 MHz digital STL "that overcomes the final technical hurdle in the totally uncompressed digital audio air chain."

CD LINK transports uncompressed, AES3, studio-standard digital audio over a standard 300 kHz RF channel.

The new STL, the company said, lets the user eliminate air chain components that use "lossy compression," a bit reduction technique that uses psychoacoustic digital compression algorithms. The company said such algorithms commonly eliminate 75 percent of a signal's digital



audio content. With the new CD LINK, users can avoid sending audio through several devices that use these techniques.

Typical signal-to-noise ratio is 93 dB,

frequency response is +/-0.1 dB. Spectrum-efficient design allows CD LINK to transport one AES stereo signal and two data channels simultaneously. An analog stereo composite output and auxiliary audio channels are available as options.

To learn more, contact Harris at (217) 222-8200; fax to (217) 224-1439; or circle Reader Service 122.

## Videoquip Handles Digital Audio

Videoquip's Phase 3 line of professional audio and video products now includes two new AES/EBU digital



audio devices. The DDA-104 is a one-input, four-output distribution amplifier for AES/EBU digital audio signals. Front-panel indicators show the presence of a valid AES/EBU signal, as well as the sampling rate (32, 44.1 or 48 kHz).

The RS-41DA is a 4x1 (four-input, one-output) routing switcher for AES/EBU digital audio. Inputs may be selected using the front-panel switches, or via the remote control connector. A front-panel Lock status indicator confirms the presence of a valid AES/EBU signal at the output. Output switch timing is synchronized with the Channel A preamble of the incoming AES/EBU signal.

Both units feature transformer-coupled inputs and outputs to improve common mode rejection over longer transmission line lengths.

In addition, a phase locked loop-based receiver allows clock recovery and regeneration, and a relocked data stream is generated at the output. All audio connectors are locking 3-pin XLR.

The Phase 3 line now has more than 40 devices for audio, video and broadcast applications.

All Phase 3 products are available for desktop or rackmount use. No AC adapters are used.

For more information, contact Videoquip Research Limited in Ontario at (416) 293-1042; fax: (416) 297-9377; e-mail via their website at <http://www.videoquip.com>; or circle Reader Service 124.

## Antex StudioCard

Antex Electronics is debuting StudioCard for Windows 95, the first plug-and-play compatible, single-PCI soundcard to offer four discrete balanced inputs and outputs available simultaneously.

This new product provides advanced digital audio recording, playback and mixing capabilities under Windows 95 for music, broadcast and post-production. With a single card, users can record and monitor four channels while simultaneously monitoring four previously recorded tracks.



Sample-accurate synchronization is possible via AES/EBU, composite video and external word clock and the StudioCard can read and write SMPTE timecode. AES/EBU and S/PDIF digital I/O are also available on the StudioCard for mastering to DAT or CD-R. Multiple StudioCards can be placed in a single PC for up to 16-track recording. StudioCard for Windows 95 has a list price of \$1,595.

For information, contact Robert Bird at Antex Electronics at (310) 532-3092 or circle Reader Service 128.

## MUSICAM USA RoadRunner

The new RoadRunner is an economical, compact portable ISDN codec/mixer from MUSICAM USA. It lets the operator send and receive mono audio over the highest quality phone lines available.



The manufacturer says the RoadRunner provides up to 20 kHz mono audio over an ISDN line.

It includes mic- and line-level mixing inputs to allow "on-the-fly" mixer.

The unit is bi-directional and includes a built-in terminal adapter.

RoadRunner is compatible with G.722, CCS MUSICAM, Layer II and Layer III codecs.

For more information, contact the company in New Jersey at (908) 739-5600, fax to (908) 739-1818, or circle Reader Service 125.

## Unique Products from Unique Systems

DAB watchers, take note.

Unique Systems of Markham, Ontario, has introduced a new line of DAB encoders, models DAB-UEN.

They are equipped with a 20-bit A/D, multidrop control bus, asynchronous AES/EBU interface, security features and a monitoring decoder capable of non-intrusive, real-time monitoring of the DAB encoded MPEG stream.

The company also is debuting its latest DAB L-Band transmitters, models DAB-UTX.

These indoor or outdoor units have a feed-forward design with output power protection, AGC input control, RS232C interface and an LCD display.

For more information, contact Unique Systems in Ontario at (905) 474-0091; fax to (905) 474-1563; or circle Reader Service 130.

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### AMPLIFIERS

#### Want To Sell

MacIntosh 2300 pwr amp. 1970 mdl, rated at 300W per chnl w/original box & literature. \$1200. J Block. Production Block Studios, 906 East 5th St, Austin TX 78702. 512-472-8975.

SAE 2200 100 W/pch, rack mount, black w/red LED display, excel. \$190. R Cobb, Solid State Record, 1044 Lightfoot Rd, Wimauma FL 33598. 813-634-1940

Crown Comtech 200 studio amp. 125 W per chnl, 4/8 ohms, 5 yrs old, little use, \$400 +shpg. B Rice, WBNI, 3204 Clairmont Ct, Ft Wayne IN 46898. 219-452-1189.

Ham radio linear kilowatt parts, roller coils, air-vacuum capacitors, tubes, sockets, meters, dial counters, chassis, panels, cabinets & pwr supply parts. F Yonker, Penn State Univ, 1229 Inverary Pl, State College PA 16801. 314-867-1400.

koudspeak KA-5700 stereo amp & loudspeaker system, complete & speaker system, complete \$345. R Streicher, Pacific Audio-Visual Enter, 545 Cloverleaf Way, Monrovia CA 91016. 818-359-8012.

Symetrix A-220, gd for parts. \$50. B Jeffries, WQOL, POB 0093, Port St Lucie FL 34985. 561-335-9300

#### Want To Buy

McIntosh Mc60, Mc40, Dynaco MK IV, Harmon-Kardon Citation II, Leak stereo 50 R Cobb, Solid State Record, 1044 Lightfoot Rd, Wimauma FL 33598. 813-634-1940.

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Andrew 11 GHz waveguide cable, 600' of GWP 90, new on reel. John, 201-228-4900.

ERI 1105 7 bay FM antenna, circularly polarized tuned to 92.7. \$5000/BO; Comark/Cablewave CFM-LP 3 bay FM antenna w/radomes, circularly polarized, tuned to 94.3. \$2500/BO. L Fuss, WDTL, POB 1438, Cleveland MS 38732. 601-846-0929.

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ERI CP-12FM center fed at 97.9 MHz w/face mounts for 24" tower w/heaters, gd cond, on tower. \$3000; Jampro JA-6-B center fed at 95.5 MHz, face mount brackets, on tower. \$500. G Gibbs, Radio Works, 1113 Neb St, Sioux City IA 51102. 712-258-0628.

**SWR** FM-TV-LPTV Antennas  
Factory Direct Sales  
Contact Jimmie Joynt  
Phone 800/279-3326 972/473/2577  
Fax 800/644-5958 972/473-2578

Jampro JSCP-6 6 bay FM antenna, 101.5 MHz, \$700. J Stortz, WKES, POB 8888, St Petersburg FL 33738. 813-391-9994.

Prime tower site, covers Johnston/Altoona PA, Rohn 300' tower, new, power block bldg, cement roof. E Sherlock, WBXQ, 4000 5th Ave, Altoona PA 16602. 814-944-9320.

RCA BFC-3B 3 bay FM w/radomes tuned to 93.5 MHz, will handle 10 kW/bay. \$2500. A Reise, WJOL, 601 Walnut St, Joliet IL 60432. 815-726-4761.

Andrew transmission line, new, 170', 1-5/8", w/Andrew connections both ends w/gas pass & gas block connections, \$10 ft. R Chambers, RS, 3015 Johnstonville Rd, Susanville CA 96130. 916-257-2121.

ERI M-1105 (2), \$900; ERI 5 bay hor 104.7, \$500; 3-port Myat manual 3-1/8" patch, new in box, \$600. G Kenny, KCL-TV, POB 932, Neosho MO 64850. 417-451-1440.

Andrew 78ARM, 3-1/8EIA-F, \$250 each. 78ARF, 3-1/8EIA-M, \$325 each. Dave, 209-754-4189.

CODE BEACON/OBSTRUCTION BULBS: The only US manufacturer of power bulbs for! One year warranty! For more information fax Michael Yoeman at 606-271-4132.

#### Want To Buy

8, 10 or 12 bay FM antenna on or near 105.9, any model, must be high power. J Davis/R Kelly, Unique Bdcg, POB 2537, Bay City TX 77914. 409-244-4170.

Good Strong 400-500' minimum 36" face tower for 90 mph wind load, also 3" coax. Bob, 970-353-6522.

### AUDIO PRODUCTION

#### Want To Sell

Altec 436A tube compressor, Handbasket Prod, 2909 So Logan, Milwaukee WI 53207. 414-482-8954.

Gentner patch bay, 48 point, ... normalled; Roland A30 midi master controller keyboard. \$400; Lexicon LXP-1 reverb unit, \$300. T Downs, 210 Cook St, Brandon FL 33511. 813-685-3740.

Restored 1950's hi-fi system, McIntosh MC-30 tube pwr amp, Fisher 70RT tuner/preamp, Garrard A TT, Berlant 31 tube tape deck, \$1000; Fisher X101 tube stereo amp, \$200; Ampex AG-500 2 trk stereo rcdr, 7.5 & 15 ips, needs belts. \$150; Ampex AG-350 R/P electr, \$125; Ampex AG-350 play electr, \$100; Ampex 2160 4 trk stereo rcdr, auto reverse, w/spkrs, \$150; Roberts 6000 4 trk stereo battery rcdr, NMR, \$50; (2) 40 W outdoor horn speakers, excel cond, \$50; Realistic 32 stereo mike mixer, excel cond, \$50; Hallicrafters S-120 SW/BC radio, gd cond, \$75; Heathkit EK-2 SW/BC radio, gd cond, \$50. R Barwig, 5254 W Agatite Ave, Chicago IL 60630. 773-283-2820.

Telbus Zephyr stereo, as new w/built-in terminal adapter. \$3800. P Christensen, Christensen Prod, 11142 Raley Creek S, Jacksonville FL 32225. 904-739-3899.

Dolby 361 type-A NR. \$650; Dolbin SCT-50 CD player/cassette recorder, excel cond, \$300. R Streicher, Pacific Audio-Visual Enter, 545 Cloverleaf Way, Monrovia CA 91016. 818-359-8012.

Dorrrough DAP 310 mono audio processor, gd cond, \$100. F Morton, KMGZ, Lawton OK. 405-250-4464.

Pultec, all models. B Elliott, Showplace Studios, 347 South Salem St, Dover NJ 07801. 201-328-4400.

Yamaha SPX90II, \$150; ARC 16 bit multiverb proc, \$150. B Jeffries, WOOL, POB 0093, Port St Lucie FL 34985. 561-335-9300.

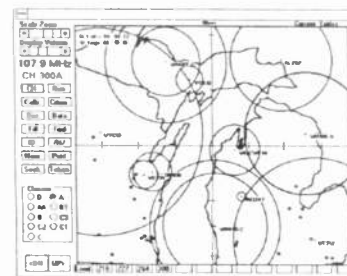
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#### Want To Buy

Neve, API, MXR, Lexicon, mic pres, Eqs, delays, compressors, harmonizers, reverbs. T Coffman, POB 17203, San Diego CA 92177. 619-571-5031.

Compressors & EQ's, tube & solid state. W Gunn, Box 2902, Palm Springs CA 92262. 619-320-0728.

### AUTOMATION EQUIPMENT

Audisk DS2000, several, stereo, some w/dual audio cards. 360 Systems switcher, install cables, \$3500-\$4500 ea. M Hijmans, Rocky Mtn Radio, POB 5559, Avon CO 81620. 970-949-3339

Audisk, recent vintage, 3 yrs old, dual audio outputs, 360 yrs old, w/manuals. BO, R Wolf, WMXR, Jct Rts 4 & 12, Taftsville VT 05073. 802-457-9494.

Scully 270 play decks, gd cond w/manuals. BO, R Wolf, WMXR, Jct Rts 4 & 12, Taftsville VT 05073. 802-457-9494.

Smartcaster digital automation system, (2) 1.2 GB internal drives, monochrome mon, \$3500. BO. (2) Sony CDK-006 CD jukeboxes, used for TM Century UDS, Format Sentry or other automation systems, \$700 ea/\$1200 both L Fuss, WDTL, POB 1438, Cleveland MS 38732. 601-846-0929.

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**Want To Buy**

**Mono or stereo IGM Instacarts:** Instacart driver card & audio cards for IGM 4000 series automation system, will take complete system. R Wolf, WMXR, Jct Rts 4 & 12, Taftsville VT 05073. 802-457-9494.

**SMC Mini-Pro** working system controller. C Cook, KNIS, 6363 Hwy 50 East, Carson City NV 89701. 702-883-5647.

**SMC RSP-1** & PDC-5 clock for automation. AH Weiner, WEGP, 3 State St Place, Presque Isle ME 04769. 207-764-4389.

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**Want To Sell**

**Audi-Cord DL** stereo R/P deck, like new, \$500; Technics RS-1520 10" r-r w/bias & EQ adjustment, professional series, \$400. E Wilk, 1112 N Grove Ave, Oak Park IL 60302. 708-524-8588.

**ITC Delta 1 (3)**, mono, play, triple tones; ITC Delta PDII, mono, play; ITC Delta PDII (2), mono, P/R; misc cart racks, carts. Kevin, KCMC, #1404 E, 332 Minnesota St, St Paul MN 55101. 406-232-5626.

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**Dynamax CTR10** stereo PB w/fast forward, \$300. J Leutinger, Big Mack Bldg, 1309 S Monroe, Joplin MO 64801. 417-624-1025.

**Spotmaster Series 3000** stereo cart machine play only, vgc, \$225 +shpg; Spotmaster 3000 R/P w/i-speed cue & triple tones, excel cond, \$350; ITC SP single play mono, gd cond, \$1500 +shpg. G Gibbs, Radio Works, 1113 Neb St, Sioux City IA 51102. 712-258-0628.

**Audi-Cart 100** R/P stereo, fair cond, \$200 +shpg. M Mathis, KKSJ, POB 1488, Searcy AR 72143. 501-268-7123.

**Harris Criterion 90-2 (7)** stereo R/P decks, desktop or rack-mount, \$300 ea; Harris Criterion 90-2 (6) PB decks, desktop or rackmount, \$200 ea; BE Splicetrak 90 eraser splice finder, \$450; A-Line cart storage, 2 wall-mount racks, ea holds 100 carts & desktop Carousel, holds 80 carts, \$150. G Jablonski, WHMI, POB 935, Howell MI 48844. 517-546-0860.

**ITC 3D** mono, \$500; ITC mono w/record, \$650. P Wahl, WWIB, Hwy 53, Chippewa Falls WI 54729. 715-723-1037.

**ITC Omega** stereo cart player, needs work, \$100; ITC SP-0004 single play cart machines, fair cond, BO. F Morton, KMGZ, Lawton OK, 405-250-4464.

**ITC rack mount** for Premium Series, gd cond, \$15. D Bailey, Rock Shoppe Prod, 10027 Church Rd, Dallas TX 75238. 214-343-0879.

**Tapecaster X700RP**, gd cond, \$495. A Ishkanian, 9091 N Congress St, New Market VA 22844. 540-740-4630.

**ITC Delta - new pinch rollers: Mono playback (2), record/play (2), stereo record/play (1). MOTIVATED! Spotmaster series 2000 record (1).** Wes, 818-798-9128.

**ITC record amps**, 3 tone, stereo, \$250 or mono \$150. W Gunn, 619-320-0728.

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**CD PLAYERS**

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**Smartcaster 486** computer w/Radio Lab switcher 8x4, new, 1 gig hard drive, video & single audio cart SX-12, \$5000; Smartcaster computer upgraded to a 486, MS-DOS 6.22, audio

cards SX-10, dbx processor, \$3000, both w/13" monochrome monitors, dbx processors, manuals. J Jindra, KNCK. 913-243-1414.

**CONSOLES**

**Want To Sell**

**Ampro 5 chnl**, 2 buses, 8 chnl, 2 buses, \$1000/both. JD Cave, WLCC, POB 387, Luray VA 22835. 800-296-2283.

**Gates Stereo 5** console, need work, BO; Gates mono 5 console, needs work, BO; E/V Tapco C-12 Series 2 console, \$900; Gates 10 chnl Snowplow (2), one works, one for parts, \$500/both. A Reis, WJOL, 601 Walnut St, Joliet IL 60432. 815-726-4761.

**Gatesway 80** 994-669-004 8 chnl mono, all caps recently changed, \$800. M Jones, WZKB, POB 520, Wallac NC 28466. 910-285-4900.

**Harris Medalist** stereo 12 chnl, \$3000. J Leutinger, Big Mack Bldg, 1309 S Monroe, Joplin MO 64801. 417-624-1025.

**McMartin 1082** 8 chnl console, \$500; Hickok 533 tube tester, \$150; Wollensak 3M 2770ds tape duplicator, \$600. A Crain, WYLT, POB 1404, Collierville TN 38027. 901-854-7148.

**Auditronics Penny & Giles faders** (16) for 110 or 501 consoles, great cond, \$320. D Bailey, Rock Shoppe Prod, 10027 Church Rd, Dallas TX 75238. 214-343-0879.

**BE 8M250** mono 8 chnl mixer. E Lyda, Media 1, Box 8488, The Woodlands TX 77387.

**Mackie 24 x 8** studio mixer, almost new, \$2400; Soundcraft Delta 8R-200, 16 x 2/1, rack mount, \$400. T Downs, 210 Cook St, Brandon FL 33511. 813-685-3740.

**McMartin B-802** 8 chnl stereo control board w/monaural meter + over \_ another McMartin board w/cards & parts, etc., \$850. M Taylor, KNEO Radio, 10827 Hwy 86 East, Neosho MO 64850. 417-451-5636.

**McMartin B-802**, stereo control board, 8 chnl w/monaural meter & over half of a McMartin board w/cards, etc. \$850. M Taylor, KNEO, 10827 Hwy 86 East, Neosho MO 64850. 417-451-5636.

**Opamp Labs 1604**, 16 input 4 group prod audio console, needs pwr supply & some work, \$500. S Kozak, Theater Snd Std, 351 Pinewood Dr, Bay Village OH 44140. 216-871-5897.

**Soundcraft Delta 14** deluxe modules, 4 dual modules, original box/manual, excel cond, \$2000. M Scharrow, Scharrow Recdg, 307 4th Ave E, Lemmon SD 57638. 605-374-3424.

**Spirit Live 4** mixing console, 12x4x2, \$1450; Mackie 1604 mixer w/expander, near new cond, \$750. R Streicher, Pacific Audio-Visual Enter, 545 Cloverleaf Way, Monrovia CA 91016. 818-359-8012.

**Soundcraft 600**, 32x16, w/patch-bay, mint, \$6950; Tascam 512, 12x8 mixer, \$750; Tascam 520, 20x8x16 mixer, \$1750; Allen & Heath SYNCON 28x24, great sound, \$8000; Ramsa 820 mixer, \$2200. W Gunn, Box 2902, Palm Springs CA 92262. 619-320-0728.

**Want To Buy**

**Ramko DC 3, 5, 8S**, stereo, working or not, for parts, mainly input/line cards. G Heidenfeldt, WRGH, 2880 W Lake Rd, Wilson NY 14172. 716-751-6187.

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**EV T18** 400 W 18" subwoofer 8 ohms, just re-cond, \$500/BO. J Cave, WEZI, 58 Kenmore St, Harrison VA 22801. 800-233-0103.

**RCA-Automatic**, giant 5"x7" cassette, heavy duty, 2 motors, battleship construction. F Yonker, Penn State Univ, 1229 Inverary Pl, State College PA 16801. 314-867-1400.

**Want To Buy**

**JBL 4343** grill logos. R Cobb, Solid State Record, 1044 Lightfoot Rd, Wimauma FL 33598. 813-634-1940.

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**Want To Sell**

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**dbx 166A** stereo compressor/limiter in like new cond, BO. J Cutroni, WCUW, 910 Main St, Worcester MA 01610. 508-753-1012.

**Orban 787A** programmable mic processor, BO; Aphex 320 Compellor, like new, BO. K Warner, WTMK, One Prudential Plaza, Chicago IL 60013. 312-946-4775.

**Texar Audio Prism (2)** w/RCF-1 replacement card 5 for Optimod 8100A, set only, \$1775. E Duellman, WQLH, 810 Victoria St, Green Bay WI 54305. 414-468-4100.

**UREI LA3A** pair, link switch added, excel cond, BO; UREI LA4 (2), silver face, excel, \$1300. M Scharrow, Scharrow Recdg, 307 4th Ave E, Lemmon SD 57638. 605-374-3424.

**Want To Buy**

**Cash paid** for tube compressor, amps, on air signs. J Phillips, 1-800-old-mics.

**RCA BA-6A:** Collins 26U or 26W; WE, all models. B Elliott, Showplace Studios, 347 South Salem St, Dover NJ 07801. 201-328-4400.

**UREI or Teletronix LA2A, LA3a, LA4A, 1176, Gates, RCA, Collins, Altec, dbx 160/165**, all types, working or not. T Coffman, POB 17203, San Diego CA 92177. 619-571-5031.

**Teletronix LA-2A's, UREI LA-3A's & LA-4's, Fairchild 660's & 670's**, any Pultec EQ's & any other old tube compressor/limiters, call after 3PM CST. 972-271-7625.

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**Want To Sell**

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**Beyer 260 (2)** ribbon mics, excel cond, \$200 ea; Shure PS1 (2)

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**Neumann U87A1 & U89i** new still under warranty, \$2250 ea. T Lawlor, Tom Lawlor Prod 6 Newborn St, Jamaica Plain MA 02130. 617-524-0844.

**Shure SM 33** cable mic still in original box w/cable & warrant card, \$250. J Borden, Handbasket Prod, 2909 So Logan, Milwaukee WI 53207. 414-482-8954.

**Countryman TVH tie-clip mic**, \$165; AKG D-140 dynamic cardioid mics (3), \$115 ea; Schoeps Collette cable KC5L w/Lemo connector & adaptor, like new cond. \$335. R Streicher, Pacific Audio-Visual Enter, 545 Cloverleaf Way, Monrovia CA 91016. 818-359-8012.

**EV RE20**, \$325. B Jfrires. WQOL, POB 0093, Port St Lucie FL 34985. 561-335-9300.

**Electro Voice RE-55** condenser Omni (2 units) with EV shock mounts, like new rarely used one Electro RE-20 without shock mounts. \$250. R Johnson, Johnson Associates. 201-387-0887

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**ITC audio switcher**, like new. 2 yrs old. \$20,000; Telos 100 Delta hybrids, direct line interfaces. 1A2 interfaces, switch consoles. BO. K Warner, WTMK, One Prudential Plaza, Chicago IL 60013. 312-946-4775

**Omnicon VLR-8** call logging recorder, \$50. E Wilk, 1112 N Grove Ave, Oak Park IL 60302. 708-524-8588

**RCA 3-1/8"** motorized coax switch \$1000 M Seaver, KHQA, 510 Maine Quincy IL 62306. 217-222-6200.

**6' metal rack cabinet**, gd cond. \$50; misc cart racks, gd & cart lazy suzans, formica & wood finish, gd cond. BO, misc cable & wire. BO F Morton, KMGZ, Lawton OK, 405-250-4464.

**ADC Pro-Patch 1/4"** (4) factory wired to Gepco snakes, never used, \$450 ea. ADC Pro-Patch TT Bantam patch bay 96 pt pre-wired to short cables, great cond. \$200; used Switchcraft style 1/4" patch bay. \$25 D Bailey, Rock Shoppe Prod, 10027 Church Rd, Dallas TX 75238. 214-343-0879.

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**Magna-Tech 92B** varispeed sync PB & extra tube, CRC 2Bpu. \$2000. G Morell, United Recdg. 681 Fifth Ave, N.Y.N.Y 10022. 212 751-0859.

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**Roland V5-880** HD digital studio workstation w V5-8F1 expansion board, 65 trks, \$1999. V Chaparro, WAYL, 545 Moultaire Wells Rd St Augustine FL 32086 904 829 9200

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**Sony PCM 501** ES digital processor for use w VCR to record digital audio in F 1 format, \$250 P Cibley, Cibley Music, POB 767 Murray Hill Sta NYNY 10156 212-532-2980

**Tascam 22-2**, rox, rack ears manual, etc. excel cond. \$450 M Scharrow, Mark Scharrow Recdg 307 4th Ave E, Lemmon SD 57638 605-374 3424

**Tascam 234** 4 trk dbx prof like new, several avail, \$300 BO. Revox A77 bdct prof grade. BO P Wahll WWIB, Hwy 53, Chippewa Falls WI 54729 715-723-1037

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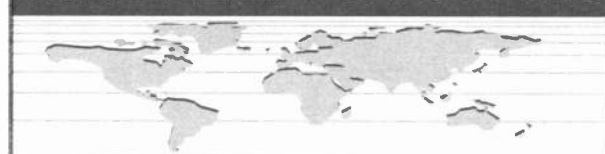
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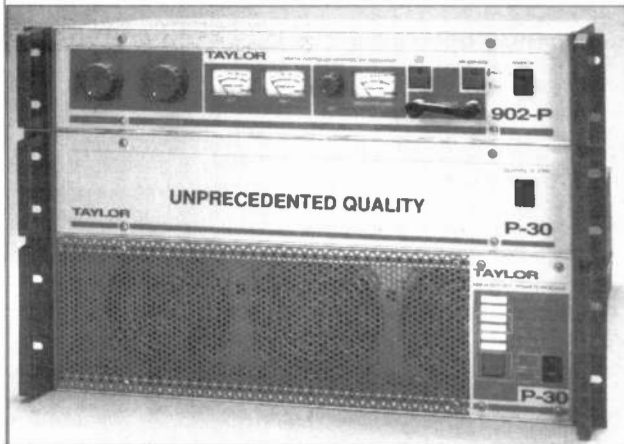
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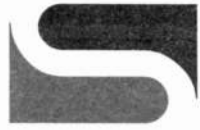
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10 yr radio pro seeks real sports-caster/play by play opportunity for baseball, football, hockey, etc. honest, enthusiastic. Walt 907-463-2590.

20 year old w/FCC licence ready to work at New Jersey station. DJ, voice overs, board operator, commercials. Brian. 908-359-3085.

Big, friendly, adult voice, nice guy, will add class to your station, news anchoring, prod, air shift, board operation, maintenance. Alex. 513-777-8423.

CE seeks position, exper w/computers, xmtrs, automations, DCS, UDS, digital studios, great references. Robert King. 702-876-5151.

Desire any size market station anywhere, committed to community involvement, veteran broadcaster can produce K-Bear Radio (Northern Exposure) style morning show. Bruce Berrigan. 216-398-6532.

Engineer/Announcer avail for Florida or Southeast AM/FM. 25 yrs exper including major market chief. Ron, 1817 CR 264, Chaffee MO 63740.

Hard-working, creative soon-to-be telecommunications graduate looking for position in audio production/scriptwriting. Willing to relocate. Demo/resume available. Brian, 330-757-1967.

Looking for a program director to make your satellite station sound local? Ten year pro with PD experience seeks small market in Midwest/Rocky Mountains. Reply to: Radio World, POB 1214, Falls Church VA 22041. Attn: Box: RW97-4-2-1.

EMPLOYMENT

Transmitter Engineer w/design, troubleshooting & installation exper in high power UHF, HF, MF and LF seeks position, will travel & relocate. George, 303-254-4500.

SBE certified technologist, associate engineer will work for exper in the Fairfield county or surrounding areas, extensive exper in digital audio editin & recording. Pete, 203-371-7162.

Recent bdctg school grad w/excel on-air personality & prod skills seeking employment. Benjamin, 405-356-9675.

Florida AT exper pro seeks new challenge anywhere in Florida, Georgia, Gulf area, Southeast1

hac/ac/Top 40/Classics, oldies, AOR. Jay Shannon, 561-770-4749.

Recent broadcasting school grad is looking to rock the world at your radio station, new fresh sound, enthusiastic. Bryan, 405-732-2748.

Recent graduate of bdctg seeking opportunity in the industry, exper in NAC format, willing to relocate. Dave, 405-799-4709.

Small market station in the SE can benefit by giving me opportunity to manage, 30+ yrs exper. POB 14706, Greenville SC 29610. 803-727-2369.

ABOUT OUR EMPLOYMENT SECTION

HELP WANTED: Any company or station can run "Help Wanted" ads for \$2/word or buy a display box for \$69/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 \$15. Responses will be forwarded to listee, unopened, upon receipt. Call 703-998-7600 for details.

POSITIONS WANTED: Anyone 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 \$15 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 P.O. Box 1214, Falls Church, VA 22041 Attn: Simone Mullins

ADVERTISER INDEX

This listing is provided for the convenience of our readers. Radio World assumes no liability for inaccuracy.

Table with 4 columns: Page No., Advertiser, Reader Service No., and a second set of Page No., Advertiser, Reader Service No. listing various companies and their corresponding page numbers.

Table listing staff roles and names: Production Director (Lisa Stafford), Production Manager (Lisa Hoagland), Publication Manager (Heather Nicholson), Classified Coordinator (Alex Frosini), Showcase Coordinator (Vicky Baron), Ad Traffic Coordinator (Kathy Jackson).

Advertising Sales Representatives

Table listing advertising sales representatives and their contact information: U.S. East Skip Tash, U.S. West Dale Tucker, U.S. Midwest Sandra Harvey-Coleman, Other Regions: Stevan B. Dana, Latin America Alan Carter, UK, Ireland Phil Guy, Europe, Africa, Middle East: Raffaella Calabrese, Asia/Pacific: Eiji Yoshikawa.

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.

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World Radio History

# Some Countries Have It ALL!



## WSIX - Nashville, Tennessee "Country Music Station of the Year"

A-500 Studio Furniture delivered March 1993  
A-500 Console S/N 20789 delivered April 1993  
A-500 Console S/N 20792 delivered April 1993  
A-6000 Studio Furniture delivered March 1995  
A-6000 Console S/N 22536 delivered March 1995  
R-16 Console S/N 22557 delivered March 1995  
SP-5 Console S/N 22593 delivered April 1995

1995 Academy of Country Music Award  
1995 Marconi Country Music Award  
1995 Billboard Country Music Award  
1995 Country Music Association Award  
1995 Country Music Association SRO Award  
1995 Gavin Country Music Award  
1996 Gavin Country Music Award  
1996 Academy of Country Music Award

*Wheatstone Model A-6000 Audio Console shown*

 **Wheatstone Corporation**  
tel 315-452-5000 / Syracuse, NY.

Circle (76) On Reader Service Card  
World Radio History